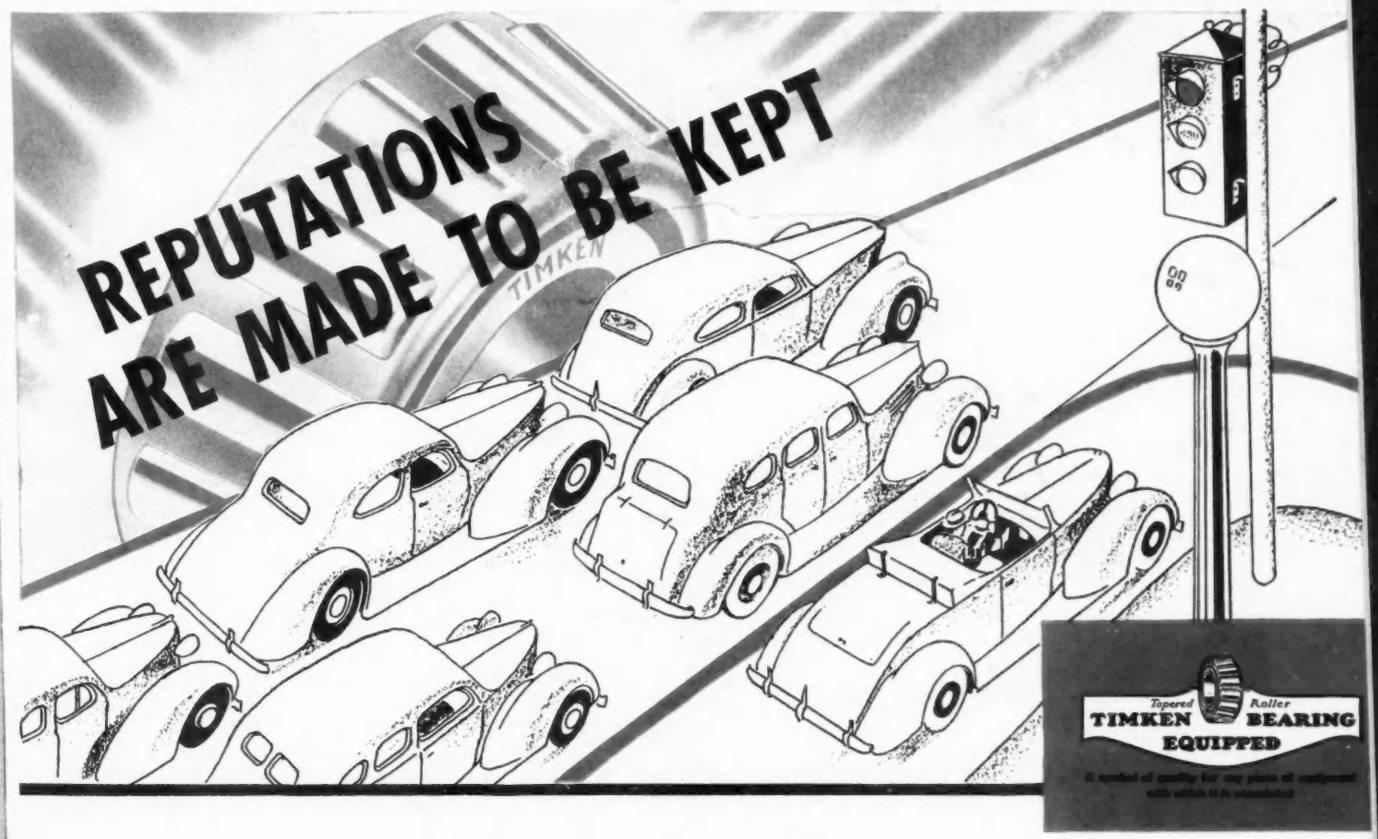
SEP 6 1938

AUTOMOTIVE INDUSTRIES

LAND — AIR — WATER

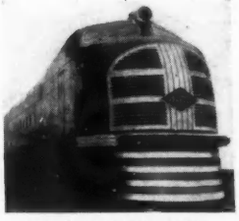
SEPTEMBER 3, 1938



The greater the reputation of any product, the greater is the manufacturer's responsibility in sustaining it.

When a manufacturer entrusts the performance of any part of his product to the products of others it pays to make sure that these products are trustworthy. This is particularly true of automobile production. That is why TIMKEN Bearings are now enjoying their 40th year of leading car manufacturers' and car buyers' confidence.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO



THE GREEN DIAMOND, Illinois Central Railroad, Speeds Smoothly On TIMKEN Roller Bearings.

GLIDE—as you ride a Timken Bearing Equipped train

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS

WHERE WAS YOUR PRODUCT WHEN THE CASH REGISTER RANG?

COST, design, and appearance are important factors that lead customers into buying some manufactured products and rejecting others.

Products fabricated from American Quality Cold Rolled Strip Steel have the smooth eye-appealing finish that helps move merchandise off the dealers' shelves and counters. It helps keep prices within the range of your customers' pocketbooks, too. For its cost is much lower than some of the more expensive metals. The ease with which it can be fabricated will reduce your rejections and wasted metal to a minimum.

Perhaps you can find a means for improving your own product at worthwhile savings through the use of American Quality Cold Rolled Strip Steel. Our sales representatives will be glad to offer you assistance in the application of cold rolled strip steel to your needs.

American Quality Cold Rolled Strip Steel is uniformly rolled from the finest materials. It is made in a complete range of widths, edges, tempers and finishes and is available in coils or in cut lengths according to your requirements. An investigation of the advantages and economies in the use of cold rolled strip steel may help you improve your products and reduce your manufacturing costs.

AMERICAN QUALITY COLD ROLLED STRIP STEEL

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* • United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

Published Weekly
Founded 1895

AUTOMOTIVE INDUSTRIES

Vol. 79, No. 10
September 3, 1938

Production

Increase of 15-25% Over '38 Expected in New Model Year

Leaders in the automotive industry, basing their opinions on current reports from their field organizations, are estimating that car and truck production during the 1939 model year will show an increase ranging between 15 and 25 per cent over 1938.

It was at these estimates, releases to parts suppliers and the busy efforts of most producers to get under way on 1939 models that observers were looking for a true picture of activity in the industry during the week ending Sept. 3 rather than at the actual record of car and truck production for the week.

The current week saw but one major producer still actively engaged in turning out 1938 cars and two others actually under way with 1939 models coming off the final assembly lines. Both of the latter were ending their second week of new model production and were expected to finish the week with a slightly higher output than during their first week. Further acceleration is anticipated with the beginning of September and succeeding weeks should see numerous additions to the list of manufacturers actually completing new cars.

Practically all new car production during September will be devoted to supplying dealers with adequate stocks as public announcements are not anticipated from most manufacturers very much in advance of the New York show. There will, however, be some announcements in advance of that date as Plymouth dealers, invited to Detroit this week to see the new cars, were told that public announcement would be made before Oct. 8.

In announcing placement of orders for 35,000 tons of steel William F. Hufstader, director of sales for the Buick Motor Division of GM, told an audience of business men in Flint that his company has set a goal of 200,000 cars for the 1939 model year with domestic sales of 1938 models totaling 158,000 units. A committee of Pontiac dealers, invited to the plant for a preview of the new model and to make suggestions and recommendations on the company's marketing plans for the new models, was told that prospects pointed to 25 per cent increase in sales for 1939. Plymouth held 53 simultaneous previews for its dealers during the current week and reported enthusiastic receptions.

The industry ended the week of Sept. 3 with an estimated total production of 14,400 cars and trucks of which slightly more than 3000 were 1939 models turned out by Buick and Plymouth. The balance was accounted for largely by Ford, which continued on 1938 production, and a few miscellaneous producers of trucks. Total production for August should approximate 84,000 cars and trucks of which about 4000 represent 1939 models.—J. A. L.

AUTOMOTIVE INDUSTRIES

Summary of Automotive Production Activity
(Week Ending Sept. 3)

BUSES Operations ranging generally between 50 and 65 per cent of "normal". One company voices opinion that outlook is less encouraging than it appeared four weeks ago. Another source reports the "dearth of rumors of interest in new orders."

TRUCKS Current activity virtually unchanged from last week and, although autumn business prospects are held by many to be encouraging, one large producer discounts the more or less optimistic tone of other manufacturers. Exports are emphasized as "notably good."

TRACTORS Varying reports include "business somewhat slackened" to "going strong." However, it is generally agreed that excellent crop conditions will have favorable influence. One company reported ready to undertake production of new small tractor-drawn combine with production of 10,000 anticipated.

MARINE ENGINES It appears that a long, quiet winter may be expected in this field.

AIRCRAFT ENGINES Army's recent purchase of seven autogiros, provided by allocation of $2,000,000 for this type of aircraft under the Dorsey bill, has further stimulated the hope of the industry that 1938 will be an all-time record year. Government interest in developing rotary wing airships is good news to engine builders.

This summary is based on confidential information of current actual production rates from leading producers in each field covered. Staff members in Detroit, Chicago, New York and Philadelphia collect the basic information, in all cases from official factory sources.

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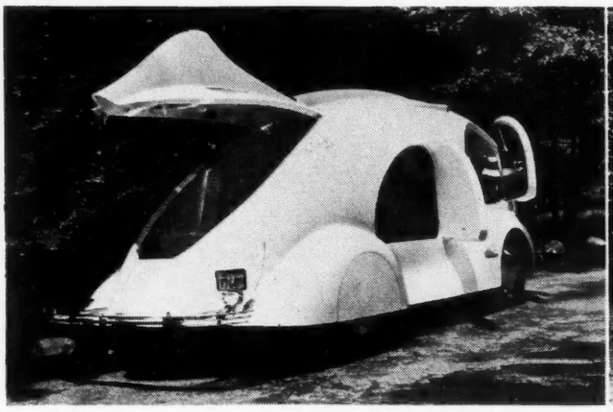
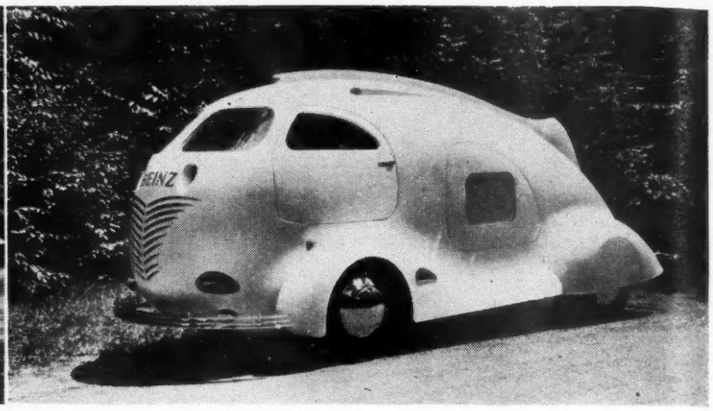
City Streets of Lansing, Mich., May Be Reo "Proving Ground"

The Lansing, Mich., city council on Aug. 30 voted to abandon its present bus transportation system in favor of an agreement under which the Reo Motor Car Co. would, in effect, make the city streets a proving ground for its new buses.

James A. Gibb, former manager of the Lansing bus system, was granted a license to operate buses for hire on the city streets in accordance with the city's bus ordinance providing he has secured and placed in service by Dec. 1 an adequate fleet of new coaches. Gibbs had previously notified the Lansing city council that he would assign his license to the Reo Motor Car Co. which, in turn, would assign the license to an operating company.

Award of the license to the manufacturer followed a political fight resulting from dissatisfaction with the present transportation system.





BORN IN A WIND TUNNEL this commercial vehicle of forward looking aerodynamic design was recently completed as the first of a fleet intended for H. J. Heinz Co. The "Comet," as the new truck is called, was designed by Rust Heinz of Pasadena, Calif., and built on an Autocar chassis by the Square Deal Body Co., Detroit. The lift door at the rear is operated by concealed hydraulic rams with power furnished by the engine and controlled by a lever in the cab.

Vehicle Taxes Up 700% in 15 Years

Study By John E. Walker Covering Period 1921-1936 Shows Payments Exceeding Expenditures for Highways

Special motor vehicle taxes paid by highway users have increased more than 700 per cent in 15 years, with the result that the total of such payments exceeded the amount of money spent for all state and county highways, including connecting streets through cities and towns.

This is revealed in a study issued today by the National Highway Users Conference under authorship of John E. Walker, former special assistant on taxation to the Secretary of the Treasury.

The study shows the average per-vehicle payment of special motor taxes jumped from $12.22 in 1921 to $48.15 in 1936, the most recent year for which official figures are available. The average special taxes paid by the various classes of motor vehicles were: passenger cars, $38.78; privately-owned and operated trucks, $80.83; contract carrier trucks, $161.66; common carrier trucks, $242.49, and common carrier buses, $785.22.

The total amount collected from highway users in special taxes during 1936 was $1,377,148,000. Of this sum, $1,066,340,000 was paid to the states in registration fees, gasoline taxes and motor carrier taxes; $18,400,000 to counties and municipalities in fees and taxes, and $292,408,000 to the Federal Government in excise taxes, which included the one cent tax on gasoline. In addition to these special taxes, motor vehicle owners paid general taxes including $41,485,000 in personal property taxes on their vehicles.

State and county highway expenditures for 1936 totalled $1,371,234,000, of which $696,433,000 was for construction, $469,202,000 for maintenance, $82,134,000 for miscellaneous purposes, $7,003,000 for equipment and machinery, $116,462,000 for interest on bonds. These expenditures did not include monies spent by WPA and other agencies for relief work on local roads.

General property taxes for state highways decreased 96 per cent during that period while funds available for state highways increased 170 per cent and the number of states levying property taxes or drawing upon general funds to build state highways dropped from 36 to 11.

Mr. Walker's study, published by the Conference under the title "High way Tax Costs," is one of a series undertaken by him to bring to light the pertinent facts bearing upon expenditures for highway purposes and taxes paid by highway users.

Passenger Car and Truck Production

Thinning to a seasonally characteristic slim figure, July passenger car and truck production (U. S. and Canada) amounted to 150,444 units, a decrease of slightly less than 21 per cent as compared with the preceding month. The appended record for seven months shows 1938 production lightened by almost 57 per cent as compared with the 1937 total of 3,373,778.

	July 1938	June 1938	July 1937	Seven Months 1938	Seven Months 1937
Passenger Cars—U. S. and Canada					
Domestic Market—U. S.	96,975	123,333	341,189	924,060	2,477,780
Foreign Market—U. S.	9,866	13,198	19,211	119,298	169,607
Canada	5,273	11,014	12,513	81,375	109,336
Total	112,114	147,545	372,913	1,124,733	2,756,723
Trucks—U. S. and Canada					
Domestic Market—U. S.	26,483	27,921	61,178	216,583	464,979
Foreign Market—U. S.	8,113	10,215	17,390	85,370	114,900
Canada	3,734	3,718	5,428	29,790	37,176
Total	38,330	41,854	83,996	331,743	617,055
Total—Domestic Market—U. S.	123,458	151,254	402,367	1,140,643	2,942,759
Total—Foreign Market—U. S.	17,979	23,413	36,601	204,668	284,507
Total—Canada	9,007	14,732	17,941	111,165	146,512
Total—Cars and Trucks—U. S. and Canada	150,444	189,399	456,909	1,456,476	3,373,778

Pak-Age-Car Corp. To Start Full Production Oct. 15

Tools and machinery have been transferred to the Connersville, Ind., plant by the Auburn Automobile Co., for the production of Pak-Age-Car delivery trucks, according to Frederick E. Schortemeier, attorney, who has filed incorporation papers at Indianapolis for the Pak-Age-Car Corp. Full production is expected to be under way by Oct. 15.

Members of the board of directors of the new corporation are John K. MacGowan, Chicago, Auburn general

manager; Victor Emanuel, New York financier; Roy H. Faulkner, Auburn vice-president, and E. G. Meldrum, Connersville, Auburn secretary.

Stutz Motor Car Co., formerly built the Pak-Age-Cars, made for light delivery of milk, bakery products and retailing.

Patents and license rights on the cars are owned by Northern Motors, Inc., Chicago, from which the defunct Stutz company had obtained manufacturing rights.

Labor Day Shutdowns to Aid Tire Inventory Reductions

With replacement tire sales holding to a pace far in excess of a normal seasonal rate, tire industry leaders see opportunity for manufacturers to further reduce inventories by reason of scheduled Labor Day shutdowns. In the Akron area the plants of the General Tire & Rubber Co., largest firm not applying original equipment tires, were closed Aug. 26 and will not reopen until Sept. 6. Plants of the B. F. Goodrich Co. closed Sept. 1 and will not reopen until Sept. 8. Firestone, Seiberling and Mohawk are scheduled to close Sept. 3, resuming Sept. 6.

Great Britain May Increase Duty On Automobiles

The section of the McKenna tariff relating to automobiles was abolished in Great Britain on Aug. 20, and while the former rate of duty of 33 1/3 per cent ad valorem remains in force for the time being, the automobile industry has been granted the right to appeal to the Import Duties Advisory Committee for an increase in the tariff. As there has been considerable agitation in the British industry against largely increased imports from Germany, it is not unlikely that an appeal for an increase in the duty on automobiles will be made before long.

Montreal Will See First Coaster Classic Oct. 1

Montreal will see its first Soap Box Derby on Oct. 1. The event sponsored by the Montreal Kinsmen Club is an effort of the organization to obtain needed funds for the opening and operation of an eye clinic for the city's under-privileged children. The "Coaster Classic" is expected to attract more than 100 entries, and to date nearly three-quarters of that number have been received.

Morris Adopts Chassisless Principle

British Company's New Series of Ten-Four Type Cars Has Half-Elliptic Springs with Torsion Bar Stabilizer

Morris Motors, Ltd., has introduced a new Ten-Four model with chassisless construction. It is a four-door light-six sedan with extended rear luggage locker and a horizontal compartment below for a spare wheel. The body is conventional in external appearance, but has sills of welded box section that are extended forward, braced by diagonal box-section struts and extensions of the side, to support the front end of the power unit, the steering gear, and radiator, and to carry the spring brackets. Conventional half-elliptic springing is used front and rear, with a torsion bar stabilizer at the front.

The stabilizer — the transverse member of which passes across the car in front of the bottom edge of the radiator core—has long integral levers extending back to an anchorage on the axle beam, and these are claimed to serve as radius rods and to assist the springs in resisting brake torque reaction.

The roof pressing is made in two forms, one for use when a sliding half-roof is required, the other when this feature is not wanted by the purchaser. In either case the roof, and also the remainder of the body is of all-steel construction.

The new engine has less piston displacement than the superseded one. The bore is the same (2.5-in.), but the stroke has been reduced from 4 to 3.54-in., thereby reducing the piston displacement from 78.8 to 69.5 cu. in., though the tax-rating (9.99 h.p.) remains the same.

The hood is novel from the standpoint of British practice, for it consists of two top panels hinged on the longitudinal center line as usual and two separate side panels which are bolted in place and to which the outer corners of the top panels are secured by locks requiring a square-taper key to operate them. The radiator shell conforms with recent Morris design and is a chromium-plated pressing.

Transmission details include a Borg & Beck clutch with cushioned hub and single-point adjustment, and a four-speed transmission with a feature new to Morris cars, though found on several other British makes, viz., synchromesh for the second speed as well as for third and high. Lockheed brakes are used for pedal operation; for the hand brake, actuating the rear shoes only, cables are carried direct from the lever between the front seats.

For a car of 10 h.p. rating, this new Morris is said to provide unusually roomy seating for four adult passengers. On a wheelbase of 94 in. and a track of 50 in., there is a rear seat 51 in. wide at elbow height. Legroom at the rear is increased by the use of tubular frame front seats with horizontal springs in tension to carry each cushion; fore-and-aft adjustment is made by means of runners flush with the floor. The latter is perfectly flat, front and rear, apart from a propeller-shaft tunnel at the rear which, incidentally, is not an inverted U pressing as usual but a slightly tapered tube welded to the steel floor. To carry the rear end of the power unit, a box-section bearer, also welded to the floor, passes under the rear end of the transmission to support it on two closely spaced rubber blocks arranged as the sides of a V. More widely spaced rubber blocks, similarly arranged, carry the front end of the unit. Prices have been reduced £10.

NO CHASSIS

of the conventional type is used in this new Morris Ten-Four model sedan. The body has sills of welded box section that are extended forward to support the front end of the engine, steering gear and radiator and to carry the spring brackets.

Ourselves and Government

A weekly check list of legislative, executive and judicial actions affecting the automotive industries. First appeared in June 25 issue, p. 831. Corrected to Sept. 1

CONGRESS

Adjourned June 16, sine die. All members of House and 36 Senators retire or face election in Autumn.

Legislative Legacies

MONOPOLY INVESTIGATION. The 12-member National Economic Committee is scheduled to issue subpoenas to business firms soon for production records, books, correspondence and additional information desired by the six Government departments participating in the inquiry. Steel, oil and insurance companies may be named in the first subpoenas. Dates for public hearings expected to be announced after Labor Day, at which time subpoenas for individuals may be issued.

WAGES & HOURS. Administrator Elmer F. Andrews is continuing conferences with members of the textile industries preliminary to naming an advisory committee whose job will be to recommend establishment of minimum wages and maximum hours. Conferences with tobacco industry representatives scheduled for this week. Andrews estimates that 4,000,000 employes will be affected immediately by either the 25c. per hour floor for wages or the 44-hour-a-week ceiling, or both.

AIRLINES. The Civil Aeronautics Authority, functioning under the recently enacted McCarran bill (S-3845) effective Aug. 23, has launched a financial survey of domestic airmail carriers aimed at fixing rates without the necessity of competitive bidding—a step urged for some time by airmail contractors. Edward J. Noble, chairman, has named C. B. Allen, aviation editor of the New York *Herald Tribune*, as temporary public relations consultant for the authority.

DEPARTMENT OF JUSTICE

MONOPOLY. Status unchanged since report in AUTOMOTIVE INDUSTRIES issue of Aug. 13.

DEPARTMENT OF LABOR

AIRCRAFT LABOR. Public contracts board has withdrawn recommendations to fix a 60-cents-an-hour minimum wage rate for workers in the aircraft manufacturing industry pending a supplementary public hearing scheduled for Sept. 8 in Washington.

CONTRACTS. For transportation equipment as reported by the three Government Departments for the week ended Aug. 25 totaled $234,091.52. Largest contract amounting to $129,376.16 went to Stewart Motor Co., Washington, D. C., for Ford trucks for the Department of Interior. Next, was a $96,095.72 contract awarded the Eclipse Aviation Division, Bendix Aviation Corp., East Orange, N. J., for generator parts for the Philadelphia Navy Yard. Contracts totaling $957,673.63 were reported for supplies classified as "other machinery." These included a $107,670 contract with the Shartle Bros. Machine Co., Division, Black-Clawson Co., Middletown, Ohio, for Jordan engines for the Ordnance Division, War Department; a $97,892.36 contract with the Caterpillar Tractor Co., Peoria, Ill., for motor patrol graders for the Agriculture Department; one for $64,740 with the Lloyd & Arms, Inc., and the Frew Machine Co., of Philadelphia, for cartridge charging machines for the Ordnance Division, War Department; two contracts, one for $63,750 for drilling machines, the other for $43,245 for chambering machines, with the Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., ordered by the Ordnance Division, War Department.

STEEL LABOR. Deadline date for filing final briefs was Aug. 22 and the Board is expected to hand down its recommendations within the next two weeks which, if approved by the Secretary of Labor, will establish the minimum wage rates below which manufacturers will not be permitted to pay their employes if they wish to be eligible for Government contracts. Board plans to eventually cover all industries doing business with the Government including the automobile industry although it may be among the last to be considered.

INTERSTATE COMMERCE COMMISSION

EFFECTIVE Oct. 1, the ICC has prescribed a maximum driving day of 10 hours to be followed by an 8-hour off-duty or rest period, or a weekly limitation of 60 hours on duty, for truck and bus drivers of common and contract motor carriers. The Public Health Service has been directed to conduct studies covering the fatigue problem, and the ICC Motor Carriers Bureau will make further studies of accident reports "for the light they may throw on the effects of safety of operation of different periods of duty."

FEDERAL TRADE COMMISSION

INVESTIGATION under the Withrow-Minton Resolution (M. J. Res. 351), Status remains unchanged since report in AUTOMOTIVE INDUSTRIES issue of Aug. 13.

F.O.B. PRICES case vs. G.M. and Ford. Hearings expected to open in September with exact date to be fixed later. Complaint alleges price advertising misleading because of failure to include standard equipment.

VS. GENERAL MOTORS on question of forcing dealers to purchase parts exclusively from G.M. sources. Hearings in New York, where Everett Haycraft is F.T.C.

(Turn to page 276, please)

New Passenger Car Registrations

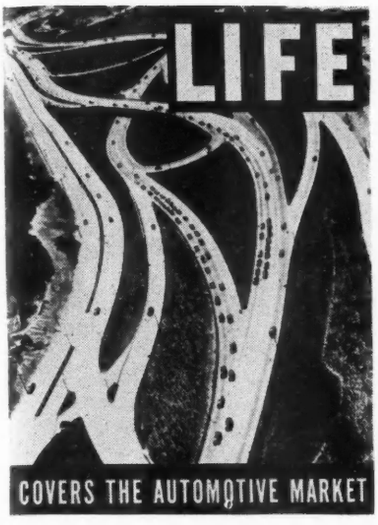
Virtually the same as the June showing, new passenger car registrations for July decreased only 3.8 per cent from the preceding month's figure to total 148,900 units. The July, 1938, total compared with the same month a year ago dropped more than 59 per cent.

Seven months' registrations for 1938 lagged behind the similar period of 1937 by 52.4 per cent, and for the nine months' model year in 1938 the record shows a decrease of 48.7 per cent, as compared with the similar period during the model year in 1937.

	JULY 1938	JUNE 1938	JULY 1937	SEVEN MONTHS 1938	SEVEN MONTHS 1937	Per Cent Change, 7 Months, 1938 over 1937	Per Cent of Total Seven Months 1938	Per Cent of Total Seven Months 1937	NINE MONTHS MODEL YEAR 1938	NINE MONTHS MODEL YEAR 1937	NINE MONTHS MODEL YEAR Per Cent Change
Chevrolet	37,706	36,083	75,468	277,421	487,358	— 43.2	24.70	20.63	372,724	616,419	— 39.5
Ford	30,499	30,414	85,130	235,329	577,534	— 59.3	20.96	24.45	275,065	652,152	— 57.8
Plymouth	22,480	24,803	49,661	159,282	313,209	— 49.2	14.18	13.26	203,794	394,241	— 48.3
Buick	12,807	12,896	20,997	93,163	125,355	— 25.7	8.30	5.31	124,167	159,975	— 22.4
Dodge	8,162	8,608	27,099	62,954	171,666	— 63.4	5.61	7.27	86,562	208,869	— 58.6
Pontiac	7,001	8,060	23,354	57,717	139,832	— 58.6	5.14	5.92	78,610	167,876	— 53.1
Oldsmobile	6,784	7,545	20,702	54,586	128,046	— 57.3	4.86	5.42	72,767	148,615	— 51.0
Packard	3,782	4,041	9,076	29,355	66,618	— 56.0	2.61	2.82	39,416	79,714	— 50.5
Chrysler	3,728	4,022	8,876	29,045	56,878	— 49.0	2.59	2.41	40,608	67,915	— 40.0
Hudson	2,962	3,281	9,452	24,109	62,641	— 61.6	2.15	2.65	32,553	77,860	— 58.2
De Soto	2,717	3,039	7,712	21,692	47,343	— 54.1	1.93	2.00	30,257	55,463	— 45.0
Studebaker	3,045	2,712	6,717	20,371	47,639	— 57.3	1.81	2.02	27,354	58,368	— 53.2
Nash	2,612	2,557	7,411	20,085	49,109	— 59.2	1.79	2.08	25,262	52,117	— 51.6
Lincoln	1,291	1,529	2,321	10,770	16,470	— 34.5	.96	.70	13,990	19,861	— 29.5
La Salle	1,083	1,095	3,060	8,354	18,731	— 55.4	.74	.79	11,622	22,931	— 49.2
Willys	982	1,000	6,117	7,934	34,940	— 77.3	.71	1.48	12,151	36,148	— 66.3
Cadillac	770	825	969	6,455	7,706	— 16.1	.57	.33	7,594	9,924	— 23.5
Graham	273	300	1,431	2,742	9,103	— 69.9	.24	.39	4,017	11,381	— 64.6
Hupmobile	114	92		705			.06		919	22	
Pierce-Arrow	2	1	5	16	147	— 89.0			30	241	— 87.7
Miscellaneous	100	102	209	860	1,798	— 52.1	.09	.07	1,160	3,636	— 68.0
Total	148,900	153,005	365,767	1,122,945	2,362,123	— 52.4	100.00	100.00	1,460,622	2,843,728	— 48.7
Chrysler Corp.	37,087	40,472	93,348	272,973	589,096	— 53.6	24.31	24.94	361,221	726,488	— 50.3
Ford and Lincoln	31,790	31,943	87,451	246,099	594,004	— 58.5	21.92	25.15	289,055	672,013	— 57.0
General Motors	66,151	66,504	144,550	497,696	907,028	— 45.2	44.32	38.40	667,484	1,125,740	— 40.6
All Others	13,872	14,086	40,418	106,177	271,995	— 61.0	9.45	11.51	142,862	319,487	— 55.2

Life Marches on Automotive Front

Picture Weekly to Use Top-Flight Merchandising Magazines In Vigorous Automotive Promotion Campaign



PAGE ONE of the *Life* 8-page insert in automotive trade publications is made to resemble the front cover of the picture weekly. The photograph shows an intersection on the Long Island Parkway a few miles from New York City.

Unique plus-values for automotive advertisers in *Life* magazine are provided by a campaign of advertising in leading automotive merchandising magazines, sponsored by *Life* and dramatizing what its advertisers are doing for the automotive merchant.

September issues of *Automobile Trade Journal, Motor Age,* and *Motor World Wholesale,* publications affiliated with AUTOMOTIVE INDUSTRIES in the Automotive division of the Chilton Co., together with the September issue of *MoToR,* will contain eight-page advertising inserts, designed to resemble *Life,* and to be the introduction to a vigorous automotive promotion campaign which will be carried out for months in carefully selected automotive publications.

Produced by Geare-Marston, Inc., Philadelphia advertising agency, the campaign *Life*-style pictures and captions based on the facts-behind-the-copy used by automotive advertisers in *Life* itself. Forcibly the merchandiser will be informed what automotive advertising copy in *Life* means to him in terms of consumer sales. The campaign will be one of the largest to appear in automotive business papers in several years, and is regarded by the publishers concerned as outstanding recognition of the function of such papers in influencing the wholesaler and retailer of automotive products.

New *Life's* first appeared, Nov. 23, 1936. Automotive advertisers in that issue included Olds, Nash, Ford, Hudson and Plymouth, and General Motors Truck in the motor-vehicle field and Havoline, Ethyl and Texaco in the fuels and lubricants field.

These and other advertisers watched with interest the appearance of an advertising insert titled "Listen" in the issue of Aug. 16, 1937. Sponsored by RCA, this insert, patterned on *Life* blazed the way for advertisers' magazines - within - a-magazine; showed the power of space dominance to an extent unused in many years.

The present *Life* insert in automotive business papers extends the "Listen" theory into another phase of merchandising and is expected to attract wide attention.

In revealing the plans for this advertising program, Howard Black, advertising director of *Life,* stated: "We have such a big story to tell in the automotive field that it deserves the most spectacular type of presentation. *Life's* influence on sales in the automotive field is tremendous. Every 1000 *Life* families own 999 automobiles. It has been proved to us by many surveys that *Life* readers buy more new cars and drive more up-to-date cars than the average. Figures show that the newer the car, the more miles it is driven each year and the more dollars spent on it for accessories and service. The average mileage of cars owned by *Life* readers is nearly 14,000 miles a year—far above the national average. It should be of great interest, therefore, to those in the automotive trade to see the products they sell advertised in such a potent sales-producing medium as *Life.* And, to those manufacturers in the automotive industry who are using *Life* to tell their story to the live, active automotive market, this new *Life* presentation in the automotive trade publications offers a plus-value in keeping the trade informed regarding their own product-advertising to the consumer. In addition to presenting news about automotive products advertised in *Life* the pages of these inserts each month will contain startling new facts about *Life* itself."

Dr. Friedrich Opel

Dr. Friedrich Opel, member of the family known as the Fords of Germany and fourth son of the founder of the Opel automobile firm in that country, died, Aug. 30, in Vienna. Doctor Opel had visited Vienna to arrange for the opening of a new branch of the company of Adam Opel, Ltd., of which he was vice-chairman. He was 63 years old.

Advertising News Notes

F. C. Himmelman, formerly sales promotion manager, Chrysler Corp., and more recently with Brooke, Smith & French, Inc., Detroit agency, has been appointed sales manager of Nelson Associates, Inc., Detroit, producers of advertising and sales promotion campaigns.

Paul W. Garrett and Kenneth Youel, General Motors publicity men, and Herbert L. Sharlock, vice-president, Bendix Aviation Corp., have joined the National Association of Accredited Publicity Directors.

James W. Hook, president of the New England Council, Boston, scathingly criticised New England industry for being too callous, inarticulate or ignorant to do anything to cultivate public good will. Of 2500 questionnaires sent out to manufacturers, only 263 bothered to reply. The scattering replies indicated, he said, that most concerns are willing to grab free publicity about plant expansion and new products in the guise of news stories which painted management as philanthropists and business pioneers. Such data as volume of freight shipments are considered to be sacred information which cannot be disclosed. Edward L. Bernays, public relations counsel, analyzed the returns with Mr. Hook.

Texas Co., which has been in the advertising news lately with bigger appropriations, will stage a "treasure hunt" in Boston. Bulletins for dealer displays, newspapers and local radio will be used to find men and women who have dormant accounts in Boston banks. John P. Kane Co. and Allen J. de Castro created the plan, and Buchanan & Co., Inc., will direct the advertising.

Fuller & Smith & Ross, Inc., will move to larger quarters at 71 Vanderbilt Avenue, New York.

KSL, the Columbia affiliate in Salt Lake City, used its portable KNEF transmitter to broadcast Capt. George E. T. Eyston's record-breaking at the Bonneville Salt Flats. The event took up an hour over the CBS coast-to-coast.

Full page advertisements in the *Saturday Evening Post* have launched the new luxury tire of Goodyear Tire & Rubber Co., known as the Double-Eagle-Air-Wheel-Tire. The schedule has not been completed, Arthur Kudner, Inc., the agency, said.

The first new business coming out of the automobile industry since last fall is Plymouth's one-minute announcement campaign, with two or three announcements a day for eleven consecutive days, beginning last Thursday (Sept. 1). Placed by J. Stirling Getchell's Detroit office.

C. Parker Holt

C. Parker Holt, vice-president and director of Caterpillar Tractor Co., who for nearly 40 years was affiliated with this company and one of its predecessors, the Holt Mfg. Co., died Aug. 24 at Piedmont, Calif.

BUSINESS IN BRIEF

Written by the Guaranty Trust Co., New York

General business activity continued to rise last week, and sentiment in business circles is becoming increasingly optimistic. For the sixth consecutive week the business index compiled by the *Journal of Commerce* showed a gain. The figure for last week was 78.4, as compared with 77.6 the week before and 101.8 a year ago. The only items in the index that declined were petroleum runs-to-stills and automobile production. Retail trade last week was from 2 to 9 per cent below that in the corresponding period last year.

The index of business activity compiled by the Guaranty Trust Co. for July stood at 68.0, as compared with 66.1 the month before and 96.1 for the corresponding period last year. The company's index of wholesale commodity prices on Aug. 15 was 63.5, as compared with 63.1 the week before and 86.5 a year ago.

Railway freight loadings during the week ended Aug. 20 totaled 597,918 cars, which marks a rise of 8357 cars above those in the preceding week, a decrease of 179,232 cars below those a year ago, and a drop of 137,558 cars below those two years ago.

Production of electricity by the electric light and power industry in the United States during the week ended Aug. 20 was 7.2 per cent below that in the corresponding period last year.

The value of foreign trade declined slightly during July, a development that is the usual seasonal occurrence. The value of exports was 2 per cent below that in June, while imports fell by 3 per cent. The value of exports last month was 15 per cent below that in July, 1937, but more than half of this decline was the result of lower prices. By volume, export sales held up relatively well. Imports were 47 per cent below those a year ago.

Lumber production during the week ended Aug. 13 stood at 66 per cent of the 1929 weekly average. Output continued to increase and was the highest for this year. New orders and shipments were both lower.

Professor Fisher's index of wholesale commodity prices for the week ended Aug. 27 stood at 80.4, as compared with 79.9 the week before and 80.2 two weeks before.

The consolidated statement of the Federal Reserve banks for the week ended Aug. 24 showed no changes in holdings of discounted bills, Government securities, and bills bought in the open market. Money in circulation declined $15,000,000, and the monetary gold stock increased $27,000,000.

International

RACING SON of a famous racing father, Gar Wood, Jr., flashes a smile of victory over the William Randolph Hearst Gold Cup which he captured in a clean sweep of the Class A events in the Regatta held recently at Chicago. Young Gar also took the trophy in 1937.

New Truck Registrations

Trend of activity of three months preceding reversed as July new truck registrations increased about 10.8 per cent over June to total 33,476. The 1938 July figure, however, trailed the mark of 61,686 established in the same month last year by almost 46 per cent.

Per cent change in the seven months of 1938 as compared with 1937 is indicated below by a minus 43.

	July 1938	June 1938	July 1937	SEVEN MONTHS 1938	SEVEN MONTHS 1937	Per Cent Change, 7 Months 1938 over 1937	Per Cent of Total Seven Months 1938	Per Cent of Total Seven Months 1937
Chevrolet	11,226	9,912	17,809	76,369	117,927	− 35.2	33.28	29.21
Ford	9,425	8,427	18,934	63,992	133,886	− 53.0	27.87	33.16
International	4,782	4,045	7,539	32,055	45,957	− 30.2	13.96	11.38
Dodge	3,236	3,055	6,508	22,835	38,139	− 40.1	9.95	9.45
G. M. C.	1,675	1,730	4,237	12,444	27,806	− 55.2	5.42	6.89
Plymouth	660	681	1,715	4,880	8,190	− 40.4	2.13	2.03
Diamond T	382	332	764	2,623	5,546	− 52.7	1.14	1.37
Mack	347	317	622	2,258	3,577	− 36.8	.98	.89
White	298	271	540	2,123	3,819	− 44.5	.92	.95
Reo	264	213	480	1,735	2,918	− 40.5	.76	.72
Willys-Overland	182	196	99	1,227	623	+ 97.0	.53	.15
Studebaker	116	158	622	1,157	3,587	− 67.8	.51	.89
Autocar	129	235	281	1,012	1,327	− 23.6	.44	.33
Federal	117	95	225	811	1,664	− 51.3	.35	.41
Divco	177	120	63	785	732	+ 7.1	.34	.18
Brockway	99	116	152	708	1,015	− 30.3	.31	.25
Hudson	67	65	579	545	3,362	− 83.6	.24	.83
Indiana	39	37	127	281	937	− 70.0	.12	.23
Stewart	36	38	107	241	784	− 69.3	.10	.19
F. W. D.	23	22	26	205	284	− 28.8	.09	.07
Pontiac	25	41		186			.08	
Sterling	34	21	34	148	220	− 32.6	.06	.05
Stutz Pak-Age Car	4	2	93	90	430	− 79.0	.04	.11
Miscellaneous	133	103	130	862	1,033	− 16.5	.38	.26
Total	33,476	30,232	61,686	229,572	403,763	− 43.0	100.00	100.00

Davis Reports New Funds For Hupp 1939 Program

Close to $2,000,000 with which to finance its program for 1939 has been assured to the Hupp Motor Car Corp., according to S. L. Davis, recently elected president. At the annual meeting of the stockholders called for Sept. 14 at Richmond, Va., Davis said the stockholders would be asked to authorize an additional million shares of stock, thus placing the company in position to secure an additional $3,000,000 at any time it might be required.

Davis emphasized that Hupp has no funded debt, no preferred stock, and that current ratio of assets to liabilities was over seven to one. The company has the lowest overhead of any in the automobile industry, and according to Davis can operate in

the black on an annual production of only 25,000 cars. In Detroit alone Hupp has production facilities permitting an output of 100,000 cars a year. Due to the company's practice of annual charge-offs on physical equipment, Hupp finds itself today with an extremely low carrying cost on fixed investments. Its plants are said to be in perfect condition, up-to-date in every respect and require no additional capital investment for new equipment or facilities for the 1939 program beyond Hupp's recent purchase of dies, tools, jigs and inventory of a value approximating $1,000,000.

"Hupp's plans for the 1939 model year, providing as they do for new lines which will put Hupp into the low-price field, should assure substantial volume for Hupp dealers," said Davis.

Labor Rumblings Again Disturb Akron Area

With materialization of the predicted August pickup in tire company employment and production, labor rumblings again are being heard in the Akron area. Published reports that the contract negotiations between the Goodyear management and the United Rubber Workers union of the CIO, which have been in progress intermittently ever since the Goodyear riots of last May, had been recessed until after Labor Day by mutual consent, have been vigorously denied by union leaders, who have launched a vigorous campaign of publicity in Akron in an attempt to lay the blame in Goodyear's lap for termination of the negotiations. Union leaders have resumed use of the daily press and the radio for a publicity barrage, accusing the Goodyear management of stalling and breaking faith, and voicing vigorous protest against the delay in signing a Goodyear contract.

Dominions Best Export Market For British Car

According to Board of Trade returns for the first half of 1938, New Zealand bought 7884 British cars during that period, valued at £982,039. The next best market was South Africa, which imported British cars to the value of £258,394, and the third was British India, whose imports were valued at £247,548. The total number of cars of British manufacture that were sold overseas during the period referred to was 26,807, valued at £3,296,919, as compared with 25,760, valued at £3,035,755 during the same period of the previous year. Less than one-third of the British cars exported went to countries outside the Empire.

Heavy Advances of Aircraft Exports Sustained In July with 165% Increase Over '37 Mark

Duplicating the pattern of export trends exemplified by data set forth in this table for many months past, aircraft figures again claim the position of dominance when compared with last year's activity. Staggering increases seem to lose their impressiveness as month follows month with percentage increases far out in front of the 100 mark. For July in the classification, "Airplanes, seaplanes and other aircraft," the number 165 tells the story of percentage advance of 1938 dollar volume over the 1937 record. Also distinguished in the data below are the export figures for Aircraft engines, which show a dollar volume increase in 1938 of virtually 138 per cent over the same month last year.

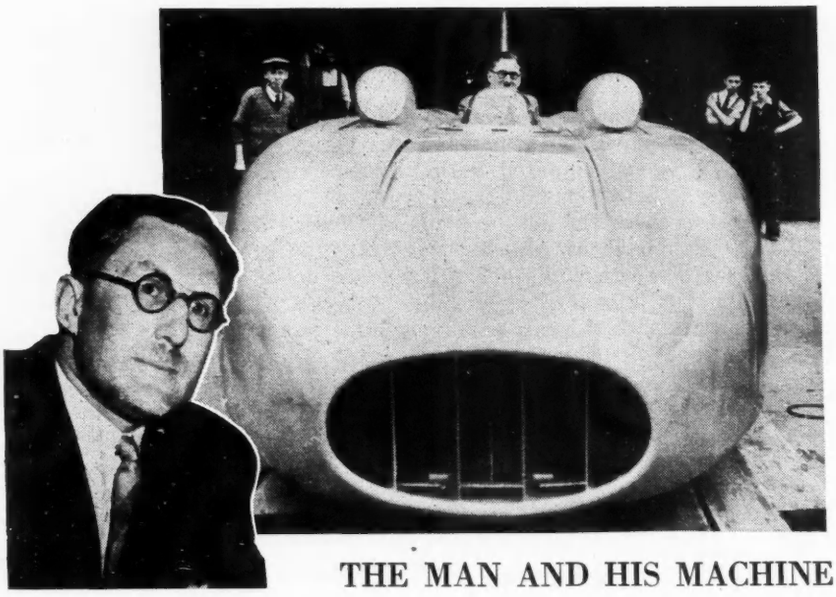
	JULY 1938		JULY 1937		SEVEN MONTHS ENDED JULY 1938		SEVEN MONTHS ENDED JULY 1937	
	No.	Value	No.	Value	No.	Value	No.	Value
EXPORTS								
Automobiles, parts and accessories		$ 17,469,175		$ 29,413,619		$ 172,037,610		$ 205,524,152
PASSENGER CARS								
Passenger cars and chassis	9,100	5,695,012	19,115	10,531,006	101,532	63,582,417	142,466	83,578,253
Low price range $850 inclusive	8,076	4,582,149	17,694	8,966,827	88,562	49,528,298	130,098	69,834,242
Medium price range over $850 to $1,200	882	857,538	1,210	1,184,085	11,048	10,792,237	10,110	9,620,256
$1,200 to $2,000	111	163,533	151	224,372	1,535	2,274,513	1,654	2,544,026
Over $2,000	31	91,792	60	155,722	387	987,369	604	1,579,729
COMMERCIAL VEHICLES								
Motor trucks, buses and chassis (total)	7,210	4,639,670	15,114	9,505,175	73,175	46,727,993	91,383	52,573,193
Under one ton	1,218	482,802	2,436	1,045,066	11,337	4,789,643	11,668	4,613,143
One and up to 1½ tons	4,634	2,578,879	9,169	4,916,558	49,003	26,714,051	61,739	30,000,500
Over 1½ tons to 2½ tons	888	626,804	2,749	1,894,754	8,010	6,534,782	13,205	9,909,119
Over 2½ tons	452	924,813	715	1,580,681	3,852	7,895,416	3,923	7,378,028
Bus chassis	18	26,372	45	68,116	973	724,101	848	672,403
PARTS, ETC.								
Parts except engines and tires								
Automobile unit assemblies		3,121,585		4,035,496		30,599,401		34,644,359
Automobile parts for replacement (n.e.s.)		2,927,570		3,735,668		21,645,550		22,240,951
Other automobile accessories (n.e.s.)		239,963		369,228		1,986,010		2,542,542
Automobile service appliances		506,744		645,780		3,629,888		3,986,590
Airplanes, seaplanes and other aircraft	72	3,572,233	37	1,351,082	507	24,578,081	324	10,296,333
Parts of airplanes, except engines and tires		1,527,946		978,575		14,149,850		5,255,302
INTERNAL COMBUSTION ENGINES Stationary and Portable								
Diesel and semi-Diesel	41	86,729	78	278,208	308	1,367,761	485	1,178,612
Other stationary and portable								
Not over 10 hp.	2,369	100,879	2,515	98,838	8,478	506,715	12,813	673,883
Over 10 hp.	449	199,102	263	135,982	2,589	1,116,378	2,166	1,018,771
Engines for:								
Motor trucks and buses	1,830	193,072	2,555	265,607	17,508	1,930,648	19,425	1,937,796
Passenger cars	2,798	233,782	4,780	342,532	29,271	2,389,141	58,639	3,977,351
Aircraft	159	1,091,754	91	459,660	769	4,433,143	633	3,486,966
Accessories and parts (carburetors)		199,120		246,426		1,665,989		1,666,840
IMPORTS								
Automobiles (dutiable)	35	42,786	374	160,066	361	231,643	1,112	716,234

Fisk Rubber Co. Signs URWU Contract

The Fisk Rubber Co., of Chicopee Falls, Mass., has become one of the largest tire manufacturers outside of the Akron, Ohio, zone to sign a contract with the United Rubber Workers Union, of the CIO. The Fisk-CIO contract recognizes the United Rubber Workers Union as exclusive representative of all employes for purposes of collective bargaining on wages, hours and working conditions.

Acme

BARRIER of steel designed by Dr. Miller McClintock which is now being tested by the Michigan Highway Commission at Lansing as a device to keep opposite lanes of traffic separated. It is 18 in. high and tapers from a tube at the top to 26 in. wide at the base.



THE MAN AND HIS MACHINE

345.49 M.P.H. or the highest land speed ever attained by man was marked up by Captain George E. T. Eyston and his seven-ton "Thunderbolt" at the Bonneville Salt Flats, Utah, on Aug. 27. The retired British Army captain's car had stepped out in earlier trials to hit 347.16 officially in one run and an unofficial 360 in another. Two runs over the mile are required and on the second the electric eye with which the American Automobile Association times the official runs, failed. It was said that the sensitive photoelectric cell was literally "blinded" by light refraction from the dazzling white salt on the course. "Thunderbolt" was painted black to overcome this difficulty before the 345.49 m.p.h. record run.

Ourselves and Government

(Continued from page 272)

attorney in charge, were resumed on Aug. 16 and are still in progress.

SIX PER CENT CASE, F.T.C. cited Ford and General Motors in July, 1937, complaining of false and misleading representations in advertising prices of automobiles. Complaint alleges advertising 6 per cent charge on deferred payments by retail purchasers is misrepresentation because no provision is made for amortization. Case now in hands of trial examiner.

FAIR TRADE PRACTICE rules for retail automobile dealers, introduced at public hearings during last NADA meeting in Detroit (see A.I., April 30, 1938), are still under study by the F.T.C. fair trade practice division headed by George McCorkle.

NATIONAL LABOR RELATIONS BOARD

REAPPOINTMENT by President Roosevelt of Donald Wakefield Smith as a member of the NLRB over the protest of the AFL points to a fight by the Federation against Smith's confirmation by the Senate.

WAR DEPARTMENT

AWARDS totaling $512,450 for instruments for airplanes were announced Monday by Acting Secretary of War Johnson. To the Sperry Gyroscope Co., Inc., Brooklyn, was given an award for $375,600 while an award for $135,850 went to the Kollsman Instrument Co., Elmhurst, N. Y.

EDUCATIONAL ORDERS PROGRAM. The seven-man board in charge of placing orders, headed by Brig. Gen. Henry H. Arnold, has submitted a plan for procedure to President Roosevelt for approval after which the program is expected to get under way. By authorizing the placing of orders amounting to $2,000,000 a year for the next five years, the program seeks to familiarize industrial firms with the country's wartime requirements and thus speed industrial mobilization in event of an emergency.

AUTOGYRO DEVELOPMENT. Authorized to spend $2,000,000 on autogyro development and other rotary-winged aircraft, the Department plans to send six autogyros, purchased early last summer before passage of the Dorsey bill and used at the Army's school in Dayton, Ohio, to the field to test the needs of the cavalry, infantry, artillery and coast artillery before authorizing further purchases. Other Government Departments, which under the authorization will also benefit from the program, have been asked to report on their experience and requirements.

NAVY DEPARTMENT

TRUCK PURCHASES. Totaling $67,724.95 contracted for with five companies: Federal Motor Truck Co., Detroit, $16,499.70 for five trucks; White Motor Co., Washington, D. C., $15,719.43 for seven trucks; International Harvester Co., $7,870 for six; Mack-International Motor Truck Co., Long Island City, N. Y., $15,628 for seven trucks; and the Corbitt Co., Henderson, N. C., $12,007.82 for four.

MEN OF THE INDUSTRY

J. EDWARD WEIT has been made president of the Atlas Bolt & Screw Co. and Atlas Car & Mfg. Co., Cleveland. Mr. Weit, associated with the company since 1900, had served the company as vice-president and sales manager.

NEIL S. GARDNER is now production manager of the Covered Wagon Co., Mount Clemens, Mich.

KENNETH H. CONDIT has resigned the editorship of the *American Machinist* to become executive assistant to the president of the National Industrial Conference Board. He will continue with the publication, however, in an advisory capacity as consulting editor. **BURNHAM FINNEY,** co-editor with Mr. Condit for the past year, succeeds him as chief editor.

A. L. CAMPBELL will be in charge of new offices opened by the Timken Roller Bearing Co. at 519 Transportation Building, Washington, D. C.

Labor

Secession of Martin Factions From CIO Anticipated

Efforts of John L. Lewis, chieftain of the Committee for Industrial Organization, to mend the breach in the affairs of the United Automobile Workers Union of America seem destined not only to widen the split but also to threaten continued affiliation of the UAW with CIO, at least insofar as the factions supporting Homer A. Martin, UAW president, are concerned.

Following conferences a week ago with groups representing Martin and the four international officers he was largely responsible for expelling from the UAW, Lewis sent letters to all UAW unions suggesting a compromise under which the expelled officers would be reinstated

Monthly Motor Vehicle Production—U. S. and Canada

	Passenger Cars		Trucks		Total Motor Vehicles	
	1938	1937	1938	1937	1938	1937
January	168,890	324,191	58,240	74,995	227,130	399,186
February	151,133	310,961	51,456	72,939	202,589	383,900
March	186,341	423,006	52,257	96,016	238,598	519,022
April	190,111	452,907	48,022	100,324	238,133	553,231
May	168,599	443,412	41,584	96,965	210,183	540,377
June	147,545	429,333	41,854	91,820	189,399	521,153
July	112,114	372,913	38,330	83,996	150,444	456,909
August	.....	317,270	.....	87,802	.....	405,072
September	.....	120,597	.....	55,033	.....	175,630
October	.....	306,040	.....	31,939	.....	337,979
November	.....	309,121	.....	67,508	.....	376,629
December	.....	258,769	.....	88,117	.....	346,886
Total	.....	4,068,520	.....	947,454	.....	5,015,974

and all disputes would be referred directly to the CIO until the time for the next UAW convention.

His suggestions have, rather generally, been accepted by branches of the UAW in sympathy with the expelled officers but actions taken by branches of the UAW supporting Martin indicate a sturdy refusal to accept the Lewis proposal and very definite resentment over Lewis' attempted "interference" in the affairs of an autonomous affiliate of the CIO.

It now appears that only a miracle will bring the rival UAW factions back together again. Most likely next development will be the withdrawal of the Martin factions of the UAW from the CIO and the result of such a step is now being considered by observers of the labor movement in the automobile industry. First threats of such a step are seen in a disclosure that the July per capita tax of 5 cents per month per member has not yet been paid to the CIO by the automobile workers union.

Thus a fight which began purely as a dispute between officers of the UAW has not only spread throughout the membership but may also bring to a head a significant realignment within the CIO. Reports from Washington indicate that a permanent split between UAW and CIO may result in the defection of other unions now lukewarm to the Lewis administration.

Eisler Engineering Co., Newark, N. J., has issued a new catalog, No. 38-T, with about 100 illustrations showing **"Transformers in the Making"** and a complete line of distribution transformers, spot welding transformers, and many types of special and standard transformers used in various industries.*

"Coming Problems Created by the Fair Labor Standards Act of 1938" is No. 28 in a series of booklet-editorials by Allen W. Rucker in collaboration with N. W. Pickering, president of Farrel-Birmingham Co., Inc. Single copies are free.*

The Fairbanks Co., New York, describes its line of **wheelbarrows and scrapers** in catalog No. 54.*

Clark Kickless Cable is described in bulletin No. 7777 just brought out by the Clark Controller Co., Cleveland.*

Advantages and features of its Airistocrat standard, deluxe, and air circulator **fan blades** are described by the Torrington Mfg. Co., Torrington, Conn., in bulletin No. 123738.*

*Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

AUTOMOTIVE ABSTRACTS

Air-Cooled Inverted-V Aircraft Engine

The DeHavilland Aircraft Co., Ltd., now has in production an inverted-V, in-line, air-cooled, geared and supercharged engine known as the Gipsy Twelve. It has passed both the 50-hour endurance test for civil-aviation engines and the more severe 100-hr. test for military engines. The former test included five hours of continuous running at maximum take-off power of 525 hp. at 2600 r.p.m. with a boost of 3½ lb. per sq. in. The V arrangement of the cylinders gives a small frontal area and also lends itself to a cowling of circular cross section of a small diameter in relation to the power developed and to that of a suitable propeller. It is stated that the ratio of the engine diameter to propeller diameter is 0.30 for the Gipsy Twelve, as compared with 0.44 for the average radial engine. The circular cowling terminates in front, without break in lines, in a through-type propeller spinner, and to insure that the clean entry thus obtained is not impaired by air scoops for cooling, the front of the engine is designed for cooling through ducts from the rear. These ducts deliver air from orifices in the leading edge of the wing in such a way that the aerodynamic efficiency is not materially affected. From the ducts the air passes through galleries outside the two banks of cylinders, and thence over the cylinder and head fins into the space between the banks, from which it escapes in a rearward and downward direction. The flow of cooling air is controlled by means of an air exit gill on the under side of the engine nacelle.

The engine has a bore of 4.65 in., a stroke of 5.51 in., a displacement of 1121 cu. in., and works with a compression ratio of 6. Cylinders are forged of carbon steel, machined on the outside and ground on the inside. Cylinder heads are of aluminum alloy, screwed and shrunk on, and the pistons are machined from upset forgings of aluminum alloy.

The international rating of the engine is 405-420 hp. at 2400 r.p.m. at 7500 ft. altitude without boost. Fuel consumption under maximum cruising conditions of 375 hp. at 2200 r.p.m is said to be 0.58-0.63 pint per hp-hr., and the dry weight of the engine is 1058 lb.—*Engineering.*

Passenger Car Production by Wholesale Price Classes
(U. S. and Canada)
Seven Months 1938 and 1937 Compared

	Seven Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
Under $750	977,719	2,635,784	− 62.9	86.93	95.61
$751-$1000	129,289	88,811	+ 46.0	11.50	3.22
$1001-$1500	14,179	22,305	− 36.5	1.26	.81
$1501-$2000	2,135	7,574	− 71.8	.19	.27
$2001-$3000	1,147	2,125	− 46.0	.10	.09
$3001 and over	264	124	+113.0	.02	.....
Total	1,124,733	2,756,723	− 59.2	100.00	100.00

Truck Production by Capacities
(U. S. and Canada)
Seven Months 1938 and 1937 Compared

	Seven Months		Per Cent Change	Per Cent of Total	
	1938	1937		1938	1937
1½ Tons and less	308,892	578,416	− 46.5	93.11	93.74
2 to 3 Tons	11,965	23,677	− 49.5	3.61	3.84
3½ Tons and over	5,362	7,709	− 30.3	1.62	1.25
Special and buses	5,524	7,253	− 23.8	1.66	1.17
Total	331,743	617,055	− 46.3	100.00	100.00

Automotive Metal Markets

Accelerated Automotive Steel Buying Brings Some Producers Near "Break Even" Point

Buying by automobile manufacturers and parts makers lifted operations of the steel industry another notch this week, bringing nearer for some producers the "break even" point. The American Iron & Steel Institute reported 44 per cent of ingot capacity in operation, compared with 42.8 per cent last week. Finishing mills were able to step up their pace, many of them nearing and a few exceeding a 50 per cent of capacity rate of operations. If no unforeseen developments upset the market's expectations, the momentum of the buying movement is thought sufficient to make possible a 60 per cent rate of operations in another month or so. The view that this level denotes the irreducible "pay point" has, however, undergone considerable modification.

At the present capacity rating of the steel industry 60 per cent of ingot output means an annual production of 42,000,000 tons, and while there have been a number of banner years, in which this figure was topped, there have been many more fairly good steel years when output fell below 40,000,000 tons. Besides the news given out by the Buick Motor Division of General Motors of orders aggregating 35,000 tons of sheet, strip and bar steel, there were reports of buying by other automobile manufacturers to cheer the steel industry. Of the Buick commitments, the larger part is now in work and the remainder is also intended for prompt shipment. All in all, resumption of mill activities, following the Labor Day shutdown, will find most of the steel producers with more satisfying orders on their books than they have had in many months.

While not much is heard about pig iron purchases by automotive foundries, there has been a fairly good movement in carload lots to automotive foundries.

Non-ferrous metal markets generally were under the influence of international developments and Wall Street this week. At the Monday opening, spot Straits tin was offered at around $11 a ton below the close of the preceding week. There was, however, virtually no buying by consumers at what many characterized a bargain price, 42.80 cents. Taking its lead from Wall Street, the market reacted on Tuesday, the price for spot Straits rising to 43.30 cents, with consumers just as apathetic as they had been on the day before.

Although copper is generally looked upon as a key war metal, London speculative interests let go of their lines when war clouds gathered once again over Czechoslovakia. Here the price of electrolytic was maintained by producers at 10⅛ cents, but there were some outside holders who offered small tonnages at 9⅞ cents, delivered Connecticut. —W. C. H.

Letters

to Automotive Industries

Editor, Automotive Industries:

There was an article in your issue of June 11 entitled "Ford Motor Develops Centrifugal Steel Casting" which I feel should not go unchallenged.

I do not believe it was the intent of the writer of this article to imply that the centrifugal process of casting was on the verge of displacing forging. Nor do I wish to minimize the apparently successful accomplishment of a noteworthy new development in the casting field, but nevertheless, there seem to me to be certain refutations which should be made to statements in that article.

May it not be that the enthusiasm of the casting industry for the new process is a silent but yet definite admission of the superiority of forgings over the steel casting for stressed parts where impact and shock must be successfully resisted and wear reduced to a minimum? A certain casting may be good enough for a particular application and may have all the properties necessary for its intended service but it is not as strong nor as dependable nor as machinable as a drop forging.

It is erroneous to believe that all gear forgings are produced with the "flow lines" parallel to the direction of stress or force. Most all gear blanks are made by the hammer-upset process whereby die design is coordinated with production to produce the flow fibers rooted at the base of the teeth and extending into the teeth at right angles to the direction of stress in service. This affords a protection against the teeth breaking off and is a distinct advantage of the drop forging over the casting, which contains no fibers due to the absence of the working refinement produced by rolling and forging.

The directional tendency of the crystal structure in the centrifugal casting is not synonymous with the flow fibers of the drop forging, and cannot compare with the strength advantages of the latter.

The shape of the centrifugal cast grain at the outer rim is an elongated grain. If there is a tendency to interlock, this tendency cannot be very great. These elongated grains, while considerably longer than those in the sand casting, cannot approach the length of the fibers in the commercial production forging. The reducing process in the modern steel mill practice performs an

(Turn to page 300, please)

Calendar of Coming Events

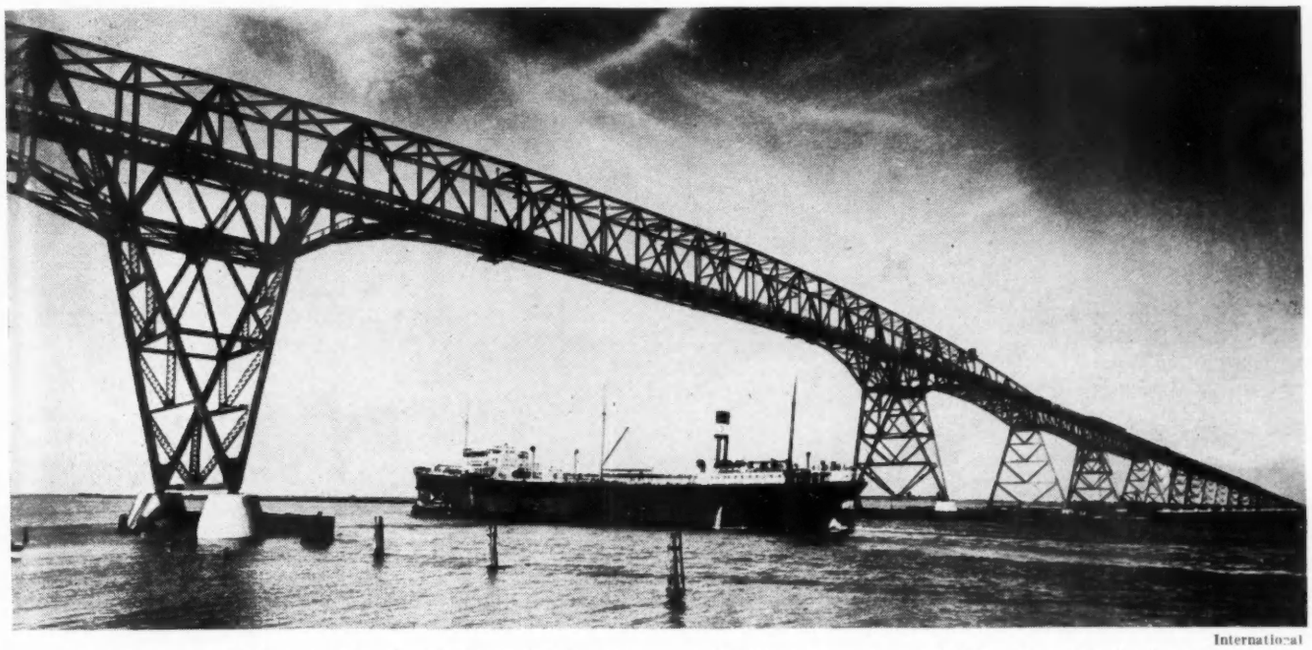
CONVENTIONS AND MEETINGS

National Petroleum Association Meeting, Atlantic City, N. J.....Sept. 14-16
American Foundrymen's Association Fall Technical Conference, Ann Arbor .....Sept. 15-17
Seventh International Management Congress, Washington .....Sept. 19-23
National Lubricating Grease Institute, Annual Convention, Chicago ..Oct. 3-4
SAE National Truck, Bus & Railcar Meeting, Chicago .....Oct. 4-5
American Society of Mechanical Engineers Meeting, Providence.....Oct. 5-7
SAE National Regional Fuel and Lubricants Meeting, Tulsa, Okla..Oct. 6-7
SAE National Aircraft Production Meeting, Los Angeles .....Oct. 13-15
A.S.T.E. Annual Meeting, Pittsburgh, Oct. 14-15
National Metal Exposition, Detroit, Oct. 17-21
American Welding Society Meeting, Detroit .....Oct. 17-21
SAE Annual Dinner, New York....Nov. 14
SAE National Transportation Engineering Meeting, New York....Nov. 14-16
National Safety Council Meeting, Chicago .....Nov. 14-18
American Petroleum Institute Meeting, Chicago .....Nov. 14-18
National Industrial Traffic League Meeting, New York .....Nov. 17-18
Automotive Service Industries Show, Chicago .....Dec. 5-10
*National Standard Parts Association Meeting, Chicago .....Dec. 2-3
SAE Annual Meeting, Detroit.....Jan. 9-13

SHOWS

20th Annual National Metal Exposition, Detroit .....Oct. 17-21
New York, National Motor Truck Show, Nov. 11-17
New York, National Automobile Show, Nov. 11-18
Pittsburgh, Pa., Automobile Show, Nov. 11-18
Detroit, Mich., Automobile Show, Nov. 11-19
Columbus, Ohio, Automobile Show, Nov. 12-18
Buffalo, N. Y., Automobile Show.Nov. 12-19
Chicago, Ill., Automobile Show.Nov. 12-19
Milwaukee, Wis., Automobile Show, Nov. 12-19
Minneapolis, Minn., Automobile Show, Nov. 12-19
*Philadelphia, Pa., Automobile Show, Nov. 12-19
*San Francisco, Calif., Automobile Show .....Nov. 12-19
Boston, Mass., Automobile Show, Nov. 12-19
Los Angeles, Calif., Automobile Show, Nov. 12-20
*St. Louis, Mo., Automobile Show, Nov. 12-20
*Elmira, N. Y., Automobile Show, Nov. 14-19
New Haven, Conn., Automobile Show, Nov. 14-19
Indianapolis, Ind., Automobile Show, Nov. 19-25
Baltimore, Md., Automobile Show, Nov. 19-26
Rochester, N. Y., Automobile Show, Nov. 19-26
Montreal, Canada, Automobile Show, Nov. 19-26
*Washington, D. C., Automobile Show, Nov. 19-26
*Cincinnati, Ohio, Automobile Show, Nov. 20-26
Newark, N. J., Automobile Show, Nov. 26-Dec .3
National Motor Show of Canada, Toronto, Ont. .....Nov. 26-Dec. 3
Denver, Colo., Automobile Show, Dec. 5-10

*Tentative



International

TALLEST highway bridge in the South is the new connecting link between Port Arthur and Orange, Texas, built at a cost of $2,750,000. The mile-and-a-half long span towers 176 ft. above the Neches River. It will be dedicated Sept. 7-8 with colorful ceremonies including a rodeo,, yacht races, aerial show and fireworks.

Truck Axles To Be Made At Chevrolet's Buffalo Plant

One hundred and thirty new machines now being installed in the Chevrolet engine and axle plant at Buffalo, N. Y., will be used in the manufacture of truck axles when the plant reopens around the middle of September. Production previously had been confined to passenger car work.

With the addition of the new line for the Buffalo plant and increased output of engines and axles for passenger cars, "definite plans" are being made to double production over former levels of 150 engines and 150 axles per day, according to Alfred G. Gulliver, plant manager.

40 Years Ago

with the ancestors of AUTOMOTIVE INDUSTRIES

The Tire Question

The tire question is giving no little vexation to the builders of electric vehicles on account of the great weight to be carried. When the weight of a vehicle and its load exceeds 2500 lb. the pneumatic loses some of its advantages. It is necessary to inflate it to such a pressure that most of its resiliency is lost and it is more susceptible to cutting and puncture.

From *The Horseless Age*, September, 1898.

Cooperatives to Build Tractors

Arthurdale Association Obtains $325,000 Federal Loan For Construction of Plant in West Virginia

Work will start soon on the construction of an addition to an existing plant at Arthurdale, W. Va., for the assembly of farm tractors. It is estimated that the plant will have a capacity of 300 tractors a year. It will be operated by four midwest wholesale cooperatives to which the facilities have been leased by the Arthurdale Association, an organization of homesteaders. For the purpose of constructing the plant the association has been granted a loan of $325,000 by the Bond Security Administration of the Department of Agriculture. The cooperatives which have signed a contract to manage the plant are the Indiana Farm Bureau Cooperative Association, the Farm Bureau Services of Michigan, the Farmers' Union Central Exchange, St. Paul, and the Consumers' Cooperative Association, Inc., North Kansas City, Mo.

The lease provides for the management of a farm equipment plant so that operations can be extended to the assembly of any kind of farm implement but present plans contemplate assembly of farm tractors. Parts will be purchased from established commercial producers. The plant will replace the one formerly managed by the same cooperatives at Battle Creek, Mich. The contract for operating the Battle Creek plant has terminated. It is expected that parts will be purchased from the International Harvester Co., which has announced that it will not sell completed tractors to cooperatives.

The new operation will extend the idea of Mrs. Franklin D. Roosevelt for setting up a subsistence homestead community at Arthurdale as an experiment in planned economy to give employment to inhabitants who had been made idle by closing down of industrial activities.

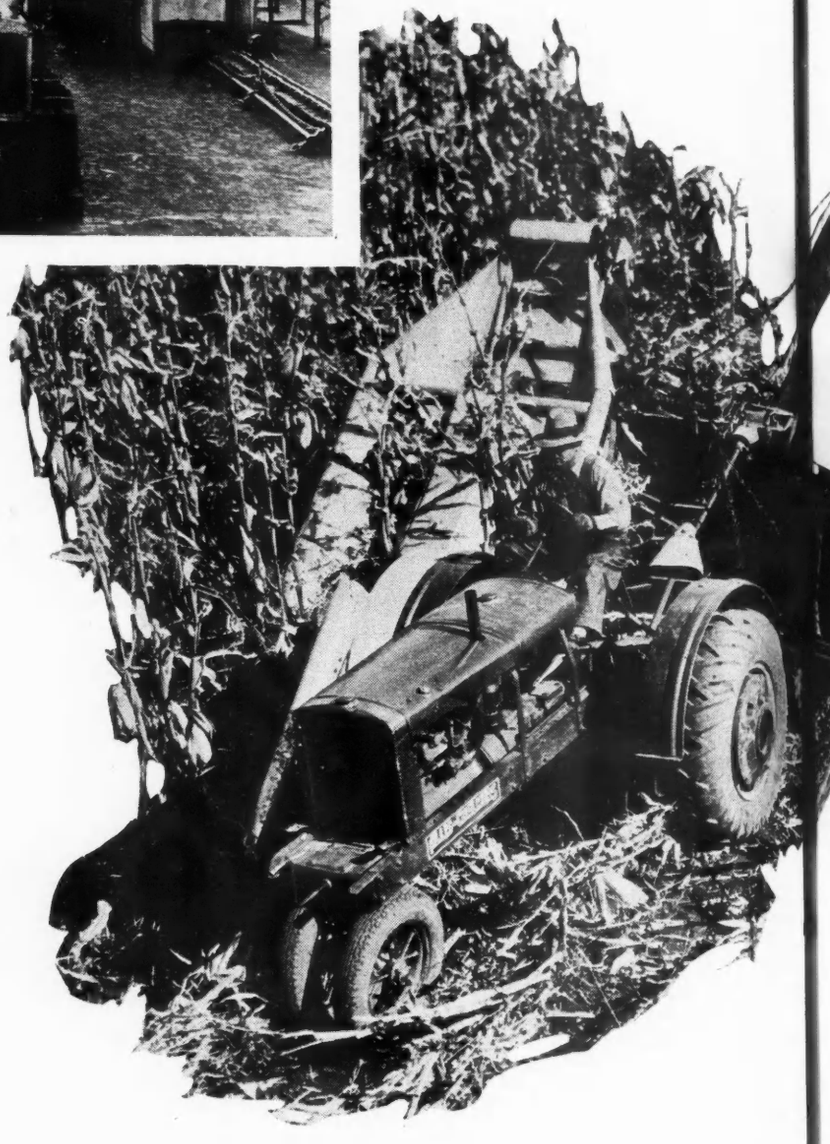
At present there are two plants operating under lease at Arthurdale. One, leased to Phillip-Jones, maker of Van Husen shirts. The other, leased to a subsidiary of the General Electric Co., maker of vacuum cleaners.

Noorduyn Aviation Ltd. Will Make Military Training Airplanes

Noorduyn Aviation, Ltd., will manufacture military training airplanes similar in type to 200 which Great Britain recently ordered in the United States. The concern is reported to have acquired Canadian manufacturing and sales rights on the training planes from North American Aviation, Inc. The fast two-seater low-wing monoplanes will be manufactured at the company's factory at Cartierville, Que.

Perspective view crawler tractor assembly line at A-C, Springfield, Ill., tractor works.

After



By JOSEPH GESCHELIN

LAUNCHING a $495 farm tractor, the lowest priced rubber tired machine on the American market, the Allis-Chalmers Mfg. Co., of Milwaukee, Wis., embarked last fall on an ambitious expansion program for its widespread tractor industry. First fruit of this program was the $4,000,000 expenditure for the erection of new buildings and new production lines at the West Allis works; buildings and equipment at the LaCrosse implement plant; and for additional equipment at the Springfield and LaPorte plants.

The forward-looking modernization project already has been amply justified and rewarded by a remarkable growth in the tractor business enjoyed by the company this spring.

The tractor division is one of the largest units of Allis-Chalmers, comprising a line of over 200 different products. It includes four different plants whose functions may be briefly noted as follows:

West Allis, Wis., producing wheel type tractors, and engines for tractors and equipment built in the other plants. This unit has a floor space of 886,665 sq. ft.

LaPorte, Ind., produces the All-Crop Harvester; an impressive line of threshers, big combines, road machinery; a complete line of power and hand controlled blade graders; and single and tandem drive Speed Patrols. This unit has a floor space of 1,317,893 sq. ft.

LaCrosse, Wis., builds an extensive line of farm implements—cultivators, plows, bedders, harrows, and many other items. It covers a floor space of 521,866 sq. ft.

Springfield, Ill., produces all A-C crawler tractors and the Speed Ace hauling units. Floor space is 402,536 sq. ft.

First entry of Allis-Chalmers in the tractor field was in 1915 when it designed and developed a three-plow machine. The second important step in the tractor market was made with the purchase of the Monarch Tractor Corp. of Springfield, Ill., in 1928. This addition marked

THIS IS THE TWENTY-NINTH IN THE SERIES
OF MONTHLY PRODUCTION FEATURES

Twenty-Three Years

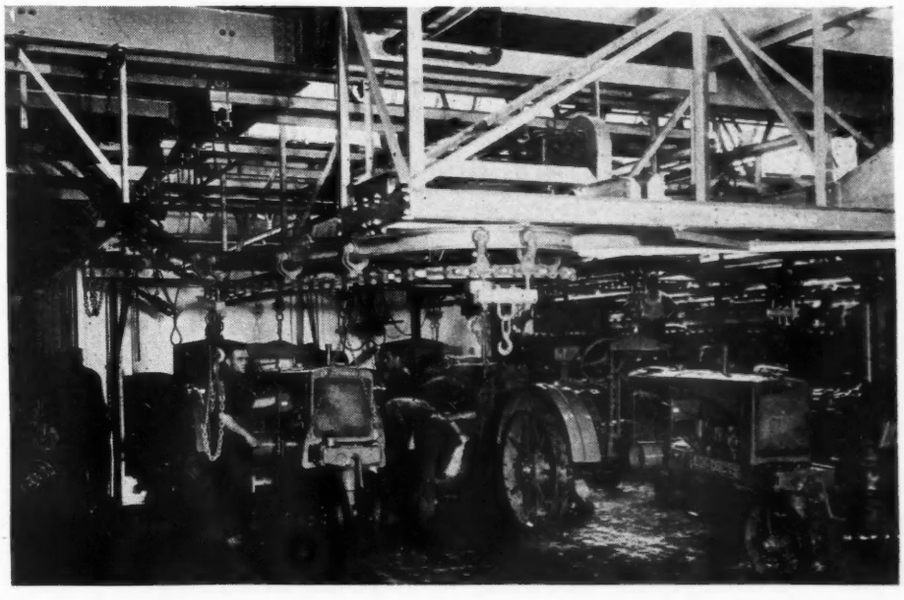
of steady growth in its tractor division, Allis-Chalmers culminates its ambitions in a $4,000,000 program of new buildings and equipment

the entrance of Allis-Chalmers into the track-type phase of the tractor industry. The company immediately began to modernize and enlarge the Springfield plant, and today this factory builds eight different models of crawler tractors which are adapted for service in every type of agricultural and industrial usage.

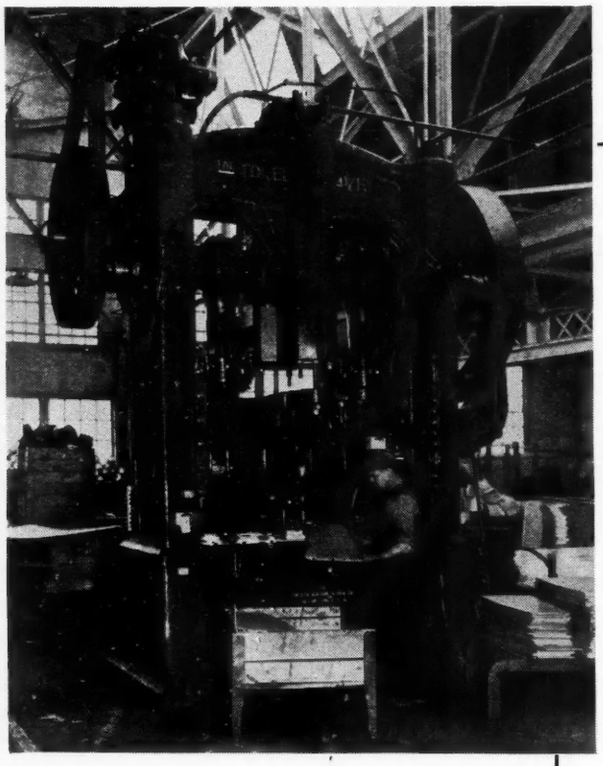
In 1929, Allis-Chalmers rounded out its line of agricultural equipment by its purchase of the LaCrosse Plow Company of LaCrosse, Wis. In 1931 the company further enhanced its agricultural line by acquisition of the Advance-Rumely Co., of LaPorte, Ind.

Further purchases in 1931 and 1932 by the tractor division of the company added a complete line of road maintainers, blade graders and speed patrols, together with clover and alfalfa hullers formerly manufactured by the Birdsell Company.

Subject of this article is a brief but comprehensive perspective of the tractor division, using the West Allis works as the background. Our study provides an opportunity to emphasize the remarkable strides in tractor



Freshly painted tractors emerging from baking oven at end of Model "W" tractor assembly line. End station pictured here, as well as similar station on "B" line, represents end view of unique Mahon installation consisting of three stages—chemical cleaning entire machine, water wash spray booth, baking oven. This is said to be the first equipment of its kind in the industry.



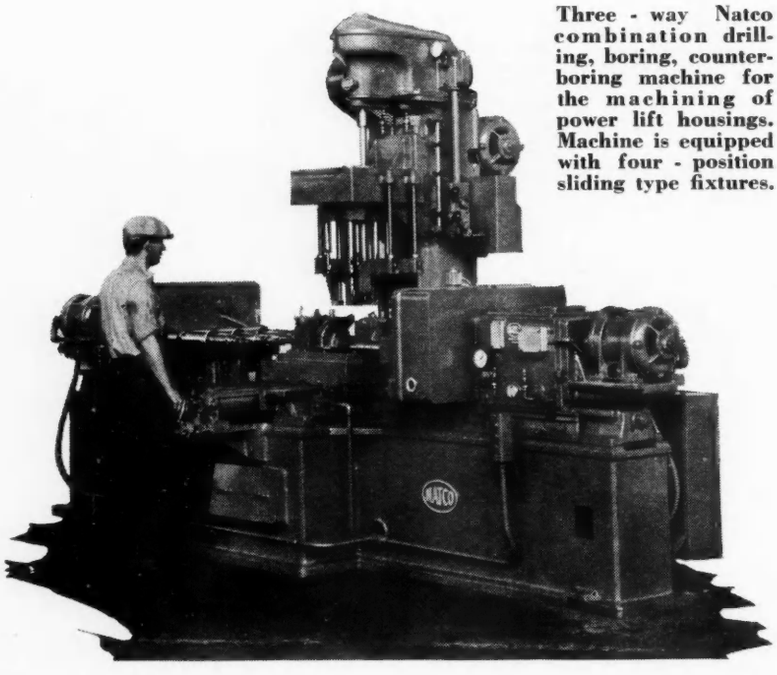
Toledo press in LaPorte, Ind., plant set up for piercing, punching, and trimming sides of cleaning shoe for All-Crop machines.

Factory Routing Cylinder Block Model W Engine

OPERATION	EQUIPMENT
Mill top and bottom	72 in. Niles rotary milling machine
Drill top and bottom and sides	Greenlee 3-way drilling machine
Mill end faces	Niles drum type milling machine
Mill pad for oil pump	Special Rockford milling machine
Drill, semi-finish ream and finish ream tappet holes	Greenlee 3-way horizontal driller
Drill angular holes	Greenlee driller
Tap bottom and valve side	Greenlee two-way tapping machine
Assemble main bearing caps	Bench
Mill faces on main bearings and caps	Newton rise and fall milling machine
Rough bore main bearings and camshaft bores	Greenlee 4-way boring machine
Rough and finish bore and rough counterbore for liners	Greenlee two-spindle boring machine
Finish counterbore for liners	Greenlee single spindle machine
Tap complete	Greenlee 4-way tapping machine
Finish bore main bearings and camshaft holes	Greenlee 2-spindle boring machine
Wash	Blakeslee washing machine

manufacture incident to the introduction of the Model B and Model WC wheel-type machines.

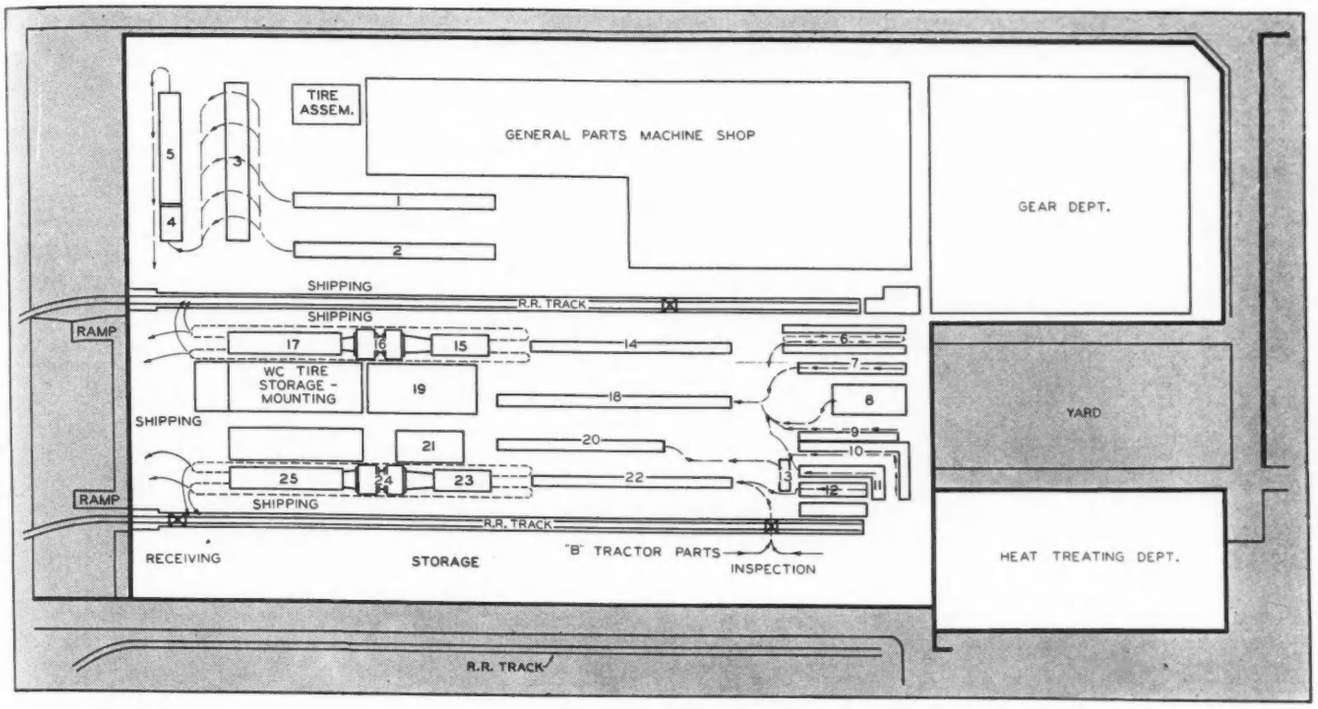
Presently we shall describe the two new buildings erected for this program at West Allis. They embody the very latest principles of modern plant layout; they feature one of the most interesting mechanized final assembly lines to be found in the tractor industry. Last but not least, the plant has been equipped with production machinery which compares both in modernity and advanced practice with the best we have seen in the leading plants of the automotive industry.



Three-way Natco combination drilling, boring, counterboring machine for the machining of power lift housings. Machine is equipped with four-position sliding type fixtures.

Recognized as a pioneer in the use of replaceable cylinder liners, the management is proud, and justly so, of the new set-up for machining cylinder sleeves which are held to maximum limits of 0.00025 in. on diameter and 0.0005 in. for out-of-roundness. Here, too, is a fine new crankshaft machining line; the Mechanical Handling Systems; power-driven floor type assembly conveyor; and an outstanding installation of Mahon cleaning and finishing equipment at the end of each of the two small tractor lines. This is thought to be the first example of chemical cleaning of complete tractors.

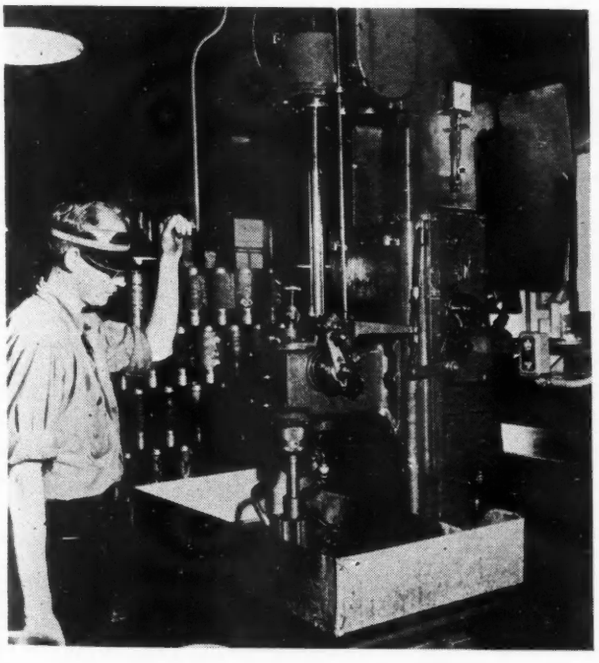
Other high-spots that may be noted in passing: use of special hard metal tool tips wherever economical, notably the cemented-carbides such as Carboloy, and Haynes-Stellite materials for large milling cutter tips; numerous lines of overhead Bull-Dog Trol-E-Duct for portable power tools; gravity roll conveyors for motor assembly lines and machine lines;



Diagrammatic floor plan of new tractor departments at West Allis, indicating the flow of materials and operations.

KEY TO DRAWING OF TRACTOR PLANT

1. "V" and "VC" Tractor Assembly
2. "WF" Tractor Assembly
3. Tractor Test
4. Spray Booth
5. Drying Oven
6. Crank Shaft Manufacturing Line
7. Connecting Rod Line
8. "W" Flywheel and Manifold
9. "W" Cylinder Liners
10. "W" Motor Block
11. "W" Cylinder Head Line
12. "B" Torque Tube Line
13. "B" Liners
14. "W-C" Tractor Assembly
15. Wash
16. Spray Booths
17. Drying Oven
18. "W" Motor Assembly Line
19. "W-C" Motor Test
20. "B" Motor Assembly Line
21. "B" Motor Test
22. "B" Tractor Assembly Line
23. Wash
24. Spray Booths
25. Drying Oven

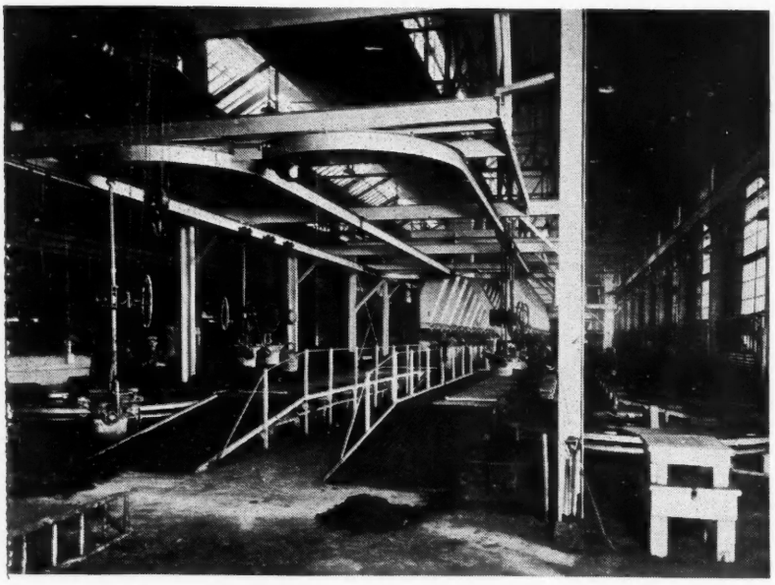


Single - spindle Moline honing machine fitted with Moline hone is used for finish-honing "W" liners.

Bullard-Dunn de-scaling machine in heat treat department; etc. Probably one of the most noteworthy details is that of cleanness in every important operation. This is assured by one of the largest installations of Blakeslee washing machines, for a plant of its size, with a washing unit for every important production line in the plant. On the new lines alone there are seven of the new Niagara washers, five of these being "wash and rinse" equipment for cleaning miscellaneous tractor parts prior to assembly and other operations. The two other machines are of the "wash and rinse with steam blow-off" type used for cleaning cylinder blocks. The steam blow-off section is located between the wash and rinse sections.

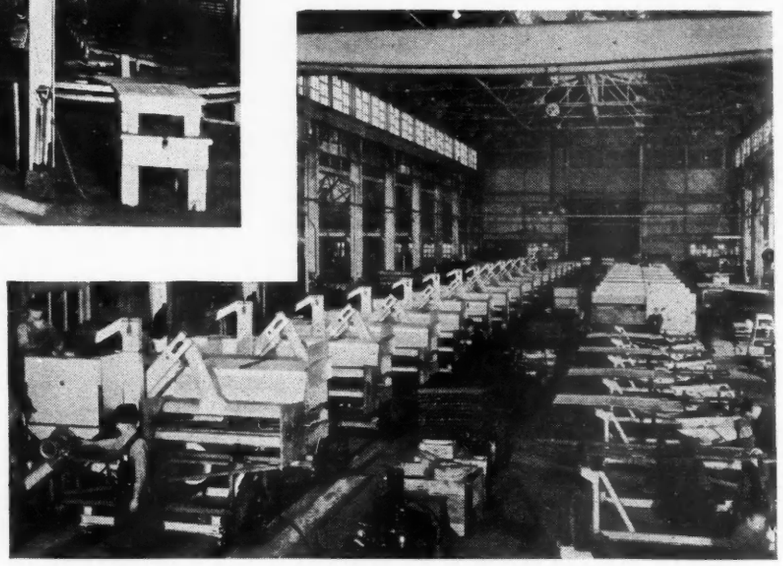
Foundry facilities will excite the admiration of foundrymen. The two foundry units at West Allis may not be the largest in the industry but certainly are among the most advanced. Here you will find examples of power - driven merry - go - round molding lines as well as automatic molding and core blowing equipment of the latest type.

Finally we may close this brief introduction by pointing to the fact that precision is the outstanding characteristic in all A-C manufacturing operations. It is a far cry from the old concept of "cast iron" engineering to the modern tractor that must be so built as to endure all the tortures of industrial and farm service from the moment the owner balances himself in the saddle. Unlike its cousin the automobile, the farm tractor has no break-in period, no coddling. To perform under these conditions the tractor must utilize the best of engineering materials, fashioned with all the precision pos-



(Left) Looking down the twin mechanized molding and pouring lines for small parts at West Allis foundry. In foreground is the pouring station. Entire installation—conveyors, molding machines, sand handling, etc.—was engineered and installed by The Jeffrey Mfg. Co.

(Below) One of the assembly lines in All-Crop Harvester works at La-Porte, Ind.



sible with modern manufacturing equipment.

Plant Layout (West Allis)

Through the cooperation of the management we reproduce elsewhere a floor plan of the new tractor works, tracing the flow of materials from the incoming stores to the shipment of complete tractors. Plant 3, approximately 210 x 600 feet, is the new building erected to handle production of the small tractors. Plant 2 is one of the older buildings but completely rearranged and equipped with new assembly lines and machinery. The Gear Department at the extreme right end of Plant 2 is a new addition.

It will be recognized that Plant 3 as well as the forward section of Plant 2 have been laid out for economical straight-line production in keeping with the most advanced principles known to factory management today. Both buildings have been inter-connected by the roofed-over railroad spur with convenient cross-over bridges at various points.

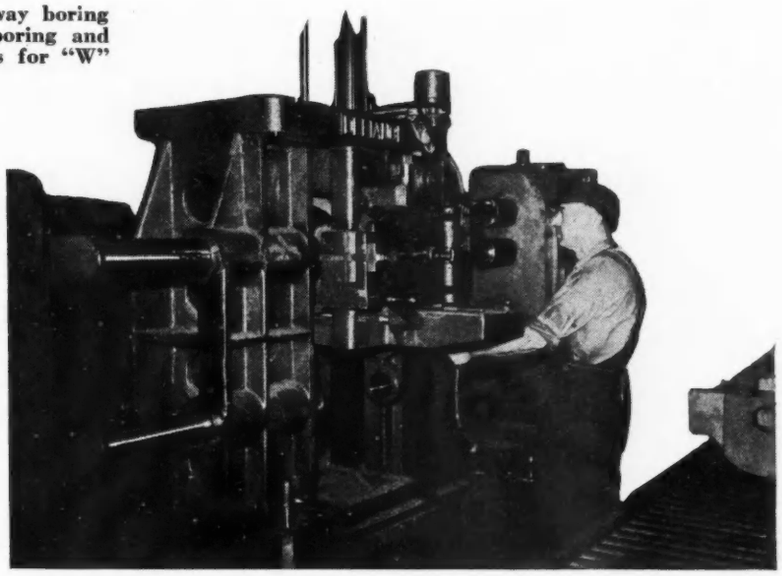
Coming to Plant 3 we find that the layout consists essentially of two parallel final assembly lines, each fed by straight-line machine lines. At the extreme right, separated from the assembly lines by a narrow aisle, is the manufacturing department for detail parts and Model WC tractor engines. It may be noted at this point that only the Model WC engine is built here completely; the Model B engine is essentially an assembled job so far as this operation is concerned.

The Model "B" Engine is assembled on a gravity roll conveyor some 125 feet in length, and then delivered by hoist to the test stands, where the engines are started with air motors and run in on Propane gas. After being run in, the valves are adjusted and the motor is load tested for power on an Allis-Chalmers electrical dynamometer. The motor is then delivered to the

Factory Routing of Pinion

OPERATION	EQUIPMENT
Mill to length and center ends	Fay automatic lathe
Drill, tap, and re-center pinion end	No. 5 Gisholt 12 in. turret lathe
Turn, face, and groove pinion end and turn center journal	LeBlond 12 in. x 6 ft. low swing lathe
Rough cut teeth 0.110 in. feed	Barber-Colman No. 17 gear cutter
Finish cut teeth 0.060 in. feed and file, carburize	Barber-Colman No. 17 gear cutter
Straighten	60-ton electric screw press
Finish turn and groove spline and thread diameter, harden	LeBlond 12 in. x 6 ft. low swing lathe
Straighten	60-ton electric screw press
Grind journals and spline diameter	Cincinnati grinder 14 in. x 18 in. external
Cut taper spline and file burrs	Barber-Colman taper hobbing machine
Mill threads	Lees-Bradner thread miller
Wash	Blakeslee washing machine

Huge Defiance three - way boring machine designed for boring and reaming clutch housings for "W" tractor.



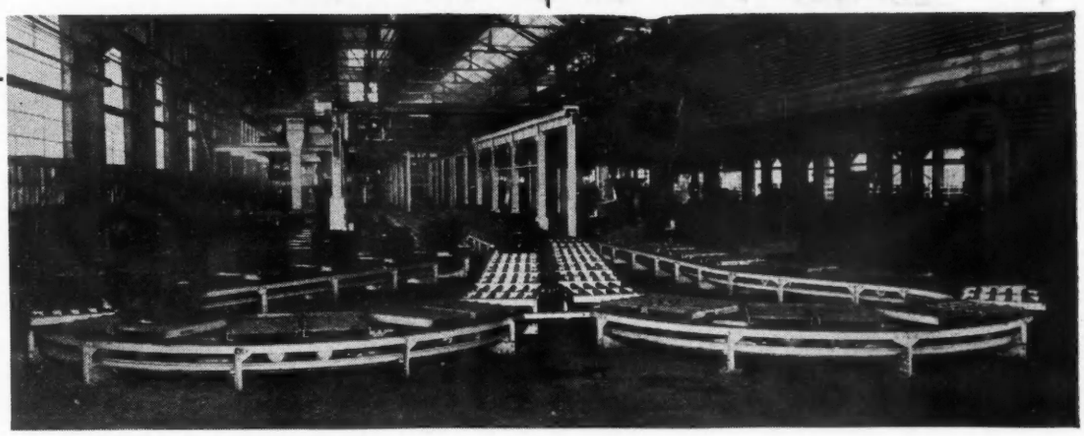
tractor assembly line, which is about 150 ft. in length, terminating at the mouth of the unique Mahon finishing equipment. The Mahon installation comprises three stages — a vapor phase washing machine that cleans the complete assembled tractor, the familiar water wash curtain spray booth, and a baking oven for the finish. This equipment has provision for two parallel lines, only one of which is in use at present.

At the end of the assembly line, each machine is engine-tested, then run onto a hydraulically operated platform which lifts the machine into position for attachment to the monorail through the Mahon equipment. The huge pneumatic tires are prepared for mounting at the extreme end of the line and when inflated and filled with the charge of water and calcium - chloride are mounted on the wheels as the tractors emerge from the baking oven.

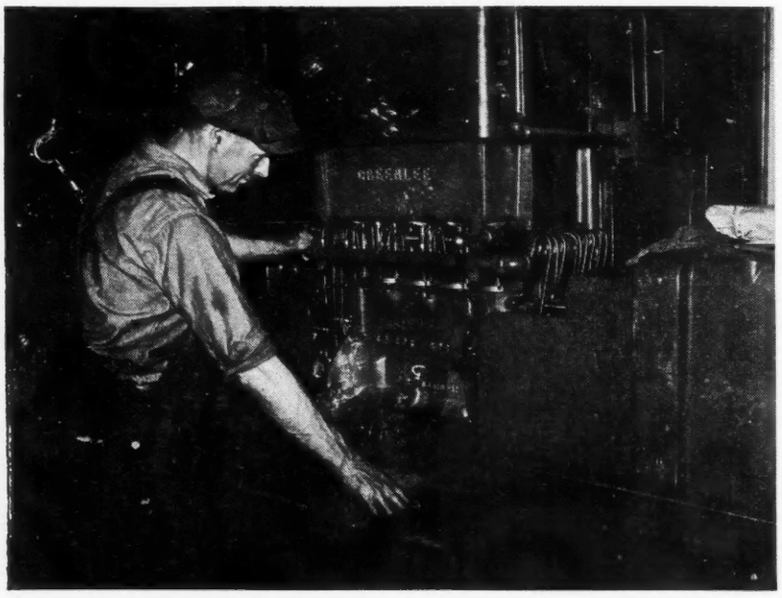
The "WC" line is the large production line at the moment and has, perhaps, more detail activity that might be noted here. As in the case of the "B" line, motor assembly and final assembly parallel each other, drawing parts from the machine shop in the rear. Materials handling devices play an important role due to the size and weight of the parts, as for example, the one-ton P & H crane over the final line which fa-

Factory Routing Crankshaft Model W Engine

OPERATION	EQUIPMENT
Mill locating pads	No. 3 Sundstrand Rigidmill
Rough turn main bearings and flange	No. 7 LeBlond crankshaft lathe
Finish turn main bearings and flange	No. 7 LeBlond crankshaft lathe
Rough turn and finish turn pin bearings	No. 6 LeBlond 2-station lathe
Mill oil groove on both ends	Smalley thread miller
Straighten center main to 0.003 in.	A-C-made hand straightening press
Drill oil, wick, and fan pulley pin. holes	Avey 6-spindle special drill press
Chamfer oil hole in thrust bearing	A-C-made special bench fixture
Grind, center and rear main bearings and flange	10 in. x 36 in. plain Landis grinder
Grind Thrust bearing, and crankshaft gear diameter	10 in. x 36 in. plain Landis grinder
Grind 4 connecting rod pins	16 in. x 42 in. Landis crank grinders (2)
Drill, tap and chamfer flange holes	Rockford special drill and tap machine
Mill keyway and ream taper hole	No. 1 U. S. key miller with special attachment for reamed hole
Dynamic balance	Globe balance machine
Polish 7 bearing surfaces and clean oil holes	Schraner hone
File burrs and chamfer oil holes	Bench
Wash	Blakeslee washing machine



Another mechanized Jeffrey molding unit, a 16-man system for cylinder heads and flywheels is shown here. The heavy - duty roller conveyor equipment was supplied by Matthews.



(Left) Close-up of work station, four-way Greenlee tapping machine on the "W" cylinder block line.

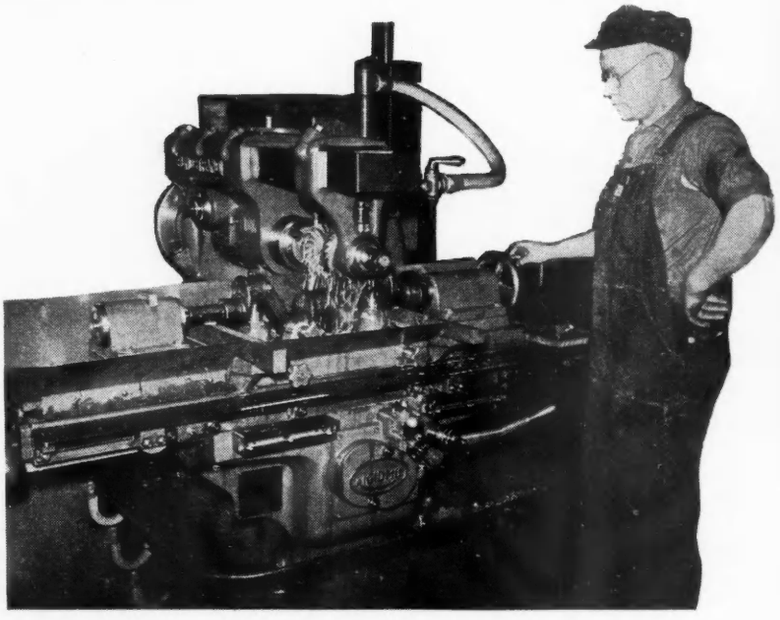
carries it onto the test stand. The test department comprises a number of parallel lines of blocks, each line fed by its own monorail. The department has a capacity of 225 engines for an eight-hour shift.

The Model WC engines are carried by special hooks on overhead rail to test stands and are tested the same as the "B" motor. After testing they are sent down to the tractor assembly line, via overhead rail with an American Monorail Pusher.

The "WC" assembly conveyor is considered to be one of the outstanding installations in the tractor industry. It is a floor platform type equipment made by Mechanical Handling Systems, a completely mechanized system with a clear length of about 150 ft. Within this span are eleven assembly stations.

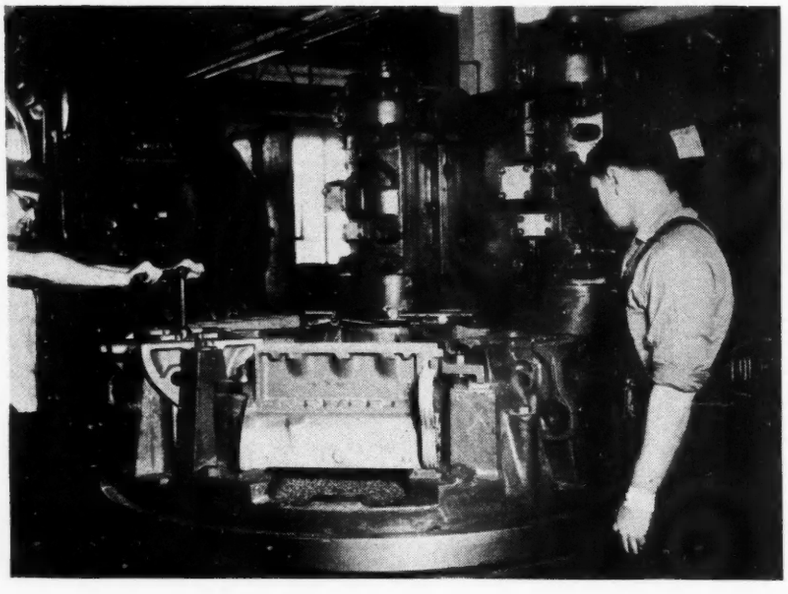
As the machines reach the final stations on this line, they are given

(Below) Husky Sundstrand Rigidmil cuts locating pads on crankshaft forging in preparation for crankshaft machine line.



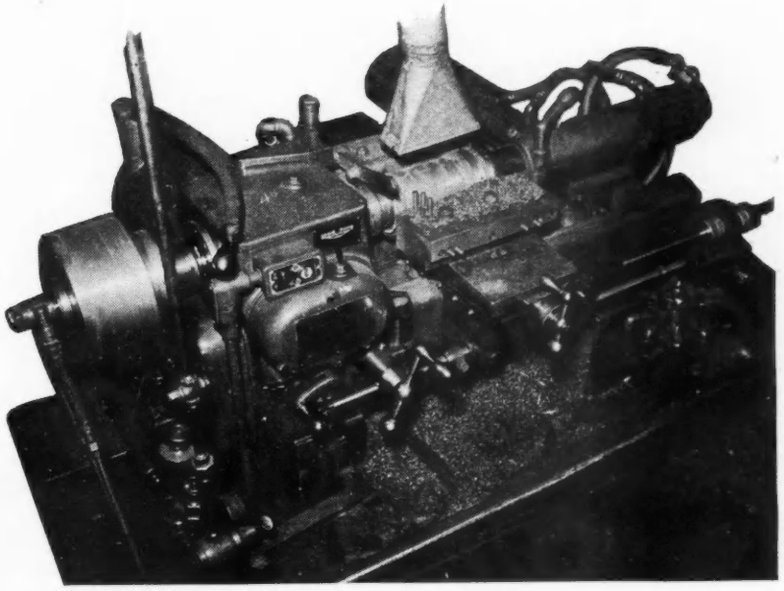
cilitates handling of the heavy rear axle.

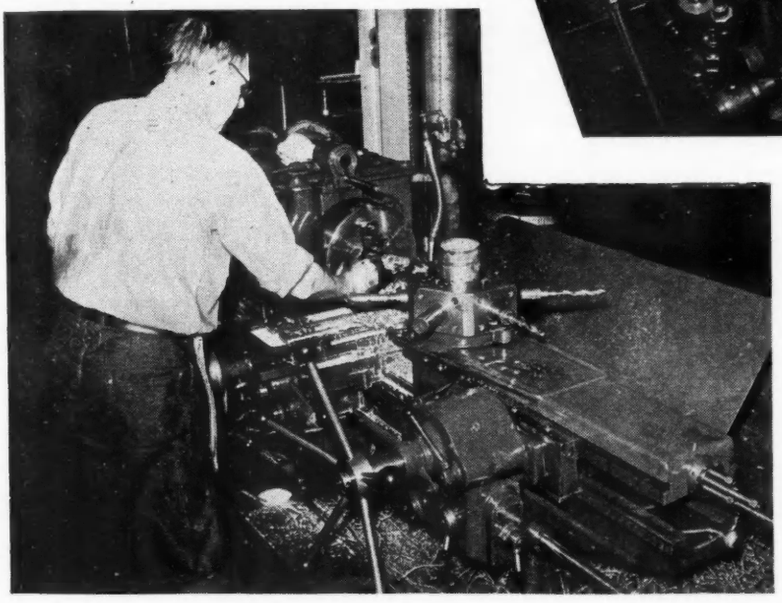
The engine assembly line is made up of sections of Matthews roller conveyors of different width, depending upon the position of the engine at various stages of assembly, varying from a very narrow section to an extremely wide section. Overhead, the line is traversed by a Bull-Dog Trol-E-Duct power line for the portable electric tools. Subassembly stations are located at right angles to the line at points of usage. The engine assembly conveyor is 175 ft. long. At its terminal, the finished engines are lifted by hoist to a monorail conveyor that



Milling top and bottom cylinder block faces on 72 in. Niles rotary mill.

a standard factory filling of water, oil, fuel, and lubrication. Completed machines then are lifted off the line by means of a two-ton American Monorail crane and run-in under power but without load. As in the case of the "B" machines, the tractor is run onto a hydraulically operated floor platform which lifts it to hook onto the monorail conveyor that runs through the Mahon washing and finishing unit.





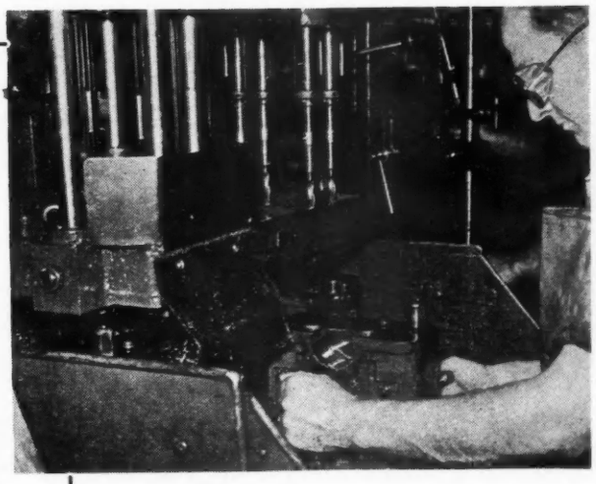
(Above) Porter-Cable Carbo-Lathe used on the "W" cylinder liner machining line for rough-turn and facing operations.

(Left) Gisholt turret lathe in gear department—drilling, tapping, etc., on pinion shaft.

(Below) Close-up work station on Natco connecting rod machine. This operation handles the drilling, chamfering, and reaming of con rod big end and cap in one setting.

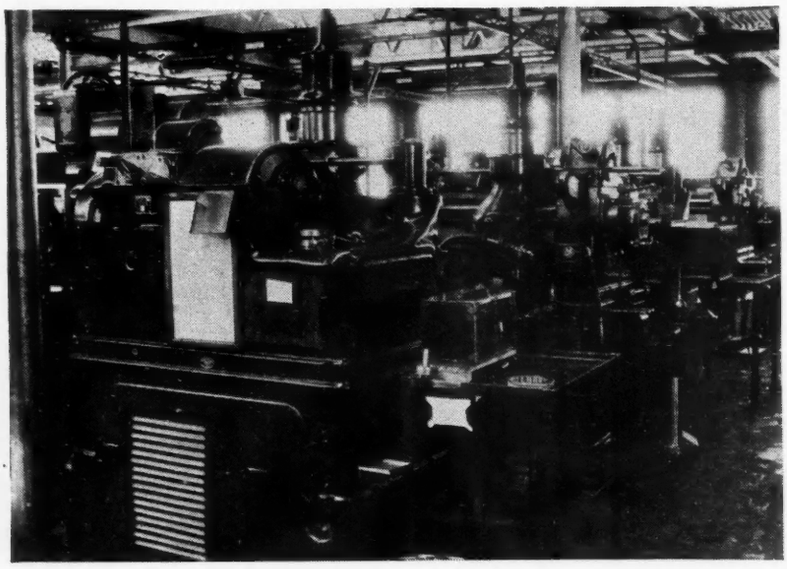
Factory Routing Cylinder Head Model W Engine

OPERATION	EQUIPMENT
Mill bottom and top faces	Niles drum miller
Mill inlet and exhaust manifold face	Kearney - Trecker Milwaukee mill
Drill, valve, push rod, stud, intake and exhaust stud and spark plug holes	Natco 2-way horizontal drill
Rough ream and counterbore and finish ream valve guide holes	Natco B-225H—2-spindle vertical machine
Tap complete	Natco screw tapping machine
Press in valve guides	Hannifin 6-ton press
Ream valve guides, counterbore for inserts and chamfer valve seats	Natco No. 9D Vertical single spindle machine
Blow out chips	A-C-made floor fixture
Assemble plugs and inserts and roll	Cincinnati - Bickford 21 in. single spindle machine
Test complete	Hannifin air fixture
Grind valve seats	Hall valve grinder (2 machines)
Wash	Blakeslee washing machine



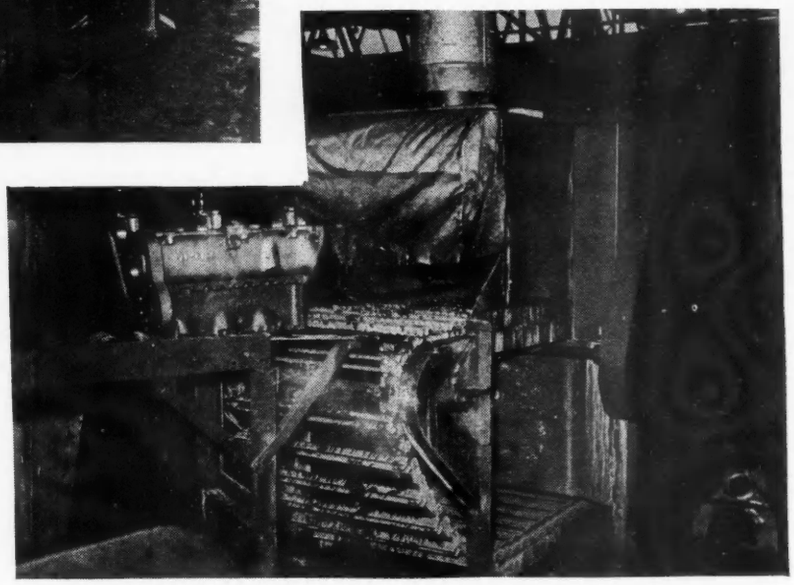
Plant 2

As will be noted on the floor plan, this unit houses two large tractor lines in the forward section, the bulk of floor space being devoted to general detail parts manufactured for various purposes. Engines for the



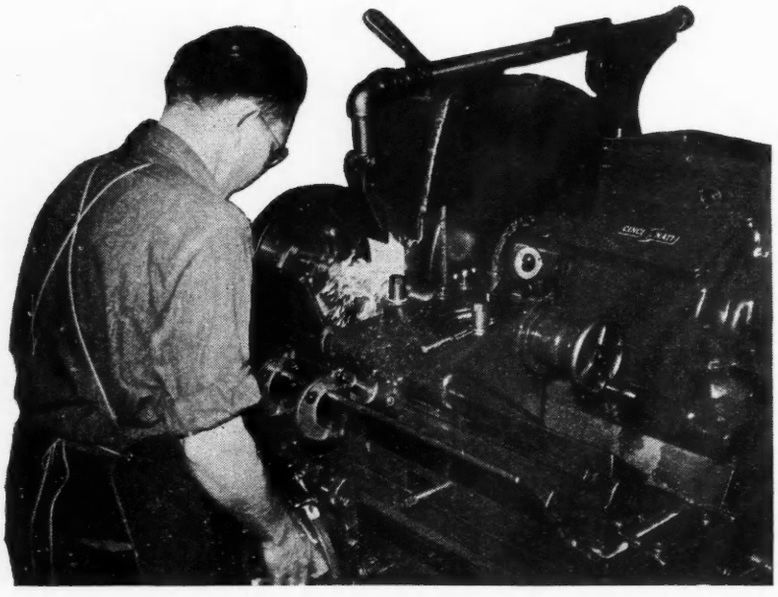
(Left) General view battery of new Fellows high speed gear shapers in transmission gear department.

(Below) One of battery of Blakeslee Niagara washing machines—Niagara washer on cylinder block machining line.



big tractors come from Plant 1, also located in the West Allis works, to which we shall devote some attention later.

The large tractors are subjected to a much more detailed test procedure as they come off the assembly lines. Here will be found six parallel dynamometer test lines on which the tractors undergo two types of tests—complete dynamometer schedules for the engine, and a belt test for performance of the entire mechanism.



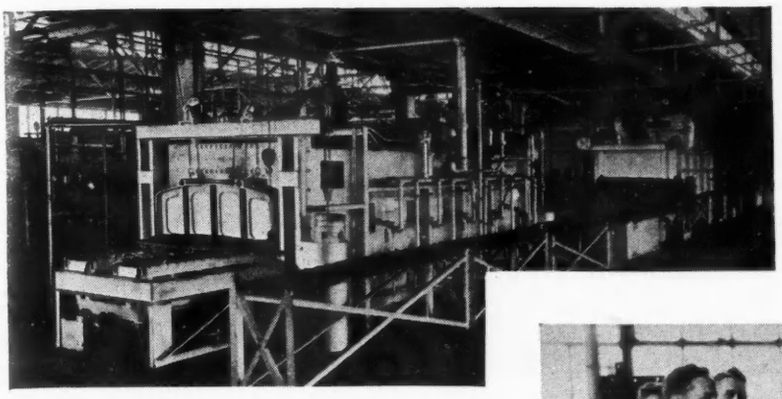
Cincinnati grinder set up for grinding journals and spline diameter on transmission pinion.

Machine shops are largely new, profiting by the modernization program. One section is set apart for the machining of tractor chassis elements such as the transmission case, rear axle housings and parts, chassis side rails. The portion of the machine shops adjacent to the gear building is departmentalized for the handling of drilling operations, automatic screw machine parts, internal gear grinding.

Gear Department

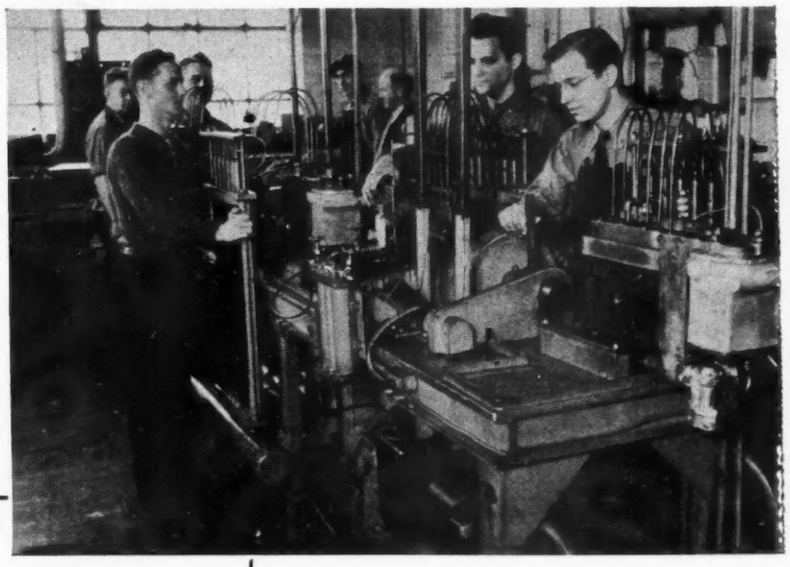
A new extension, about 200 x 200 ft., houses the gear manufacturing facilities for the entire Allis-Chalmers tractor industry. In variety, therefore, this department has a sizeable problem, what with multiple-lots, the gamut of gear tooth types from straight spur to spiral bevels, and an amazing range of sizes.

Since it would be quite beyond the scope of this discussion to describe the gear department comprehensively, we have reproduced the routing of a stem pinion which gives a



(Left) Propane-fired pusher type hardening and drawing furnace made by Surface Combustion Corp. Used in heat treatment of heavy tractor such as axles and stabilizer cranks. Draw furnace in rear is of recirculating air type.

(Below) DECO fuel pumps, standard equipment on A-C oil engines, are inspected in this department before going to the engine assembly line.



rather interesting cross-section of machine-to-machine movement for a typical piece of work.

We may note, however, some of the items of new equipment that have been installed recently as evidence of the modernity of the set-up.

Factory Routing Torque Tube Model B Tractor

OPERATION	EQUIPMENT
Mill both ends, bore and drill flange holes	Stokerunit special milling and drilling machine—4-position
Drill angular and some through holes	Stokerunit special drill — 3-drill heads
Drill and tap steering post, tool box and attachment holes	4-ft. American radial with trunnion fixture
Wash	Blakeslee washer

an initial battery of two of the new Barber-Colman taper spline hobbing machines. An example of the work done on the B-C Type D hobber is the hobbing of spiral steering sector

It is of interest to note in this connection that gears are hobbed or shaped depending upon size and form; or rough-hobbed, then shaped. However, there are neither finish-grinding nor lapping operations after heat treatment, as such refinements are considered unnecessary in well cut and precisely treated tractor gears.

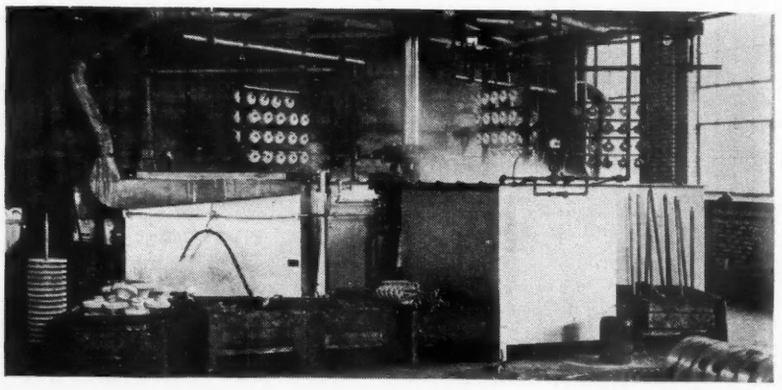
For primary gear finishing, this department boasts a battery of the new Fellows high-speed gear shapers. There is a large battery of Barber-Colman hobbing machines which has been in service for some time, now supplemented with several of the new Barber-Colman Type D heavy-duty hydraulic gear hobbers for large gears. In addition, there is

Grinding crankshaft pins on Landis crank grinder. This is one of a battery of Landis grinders in the new crankshaft department.

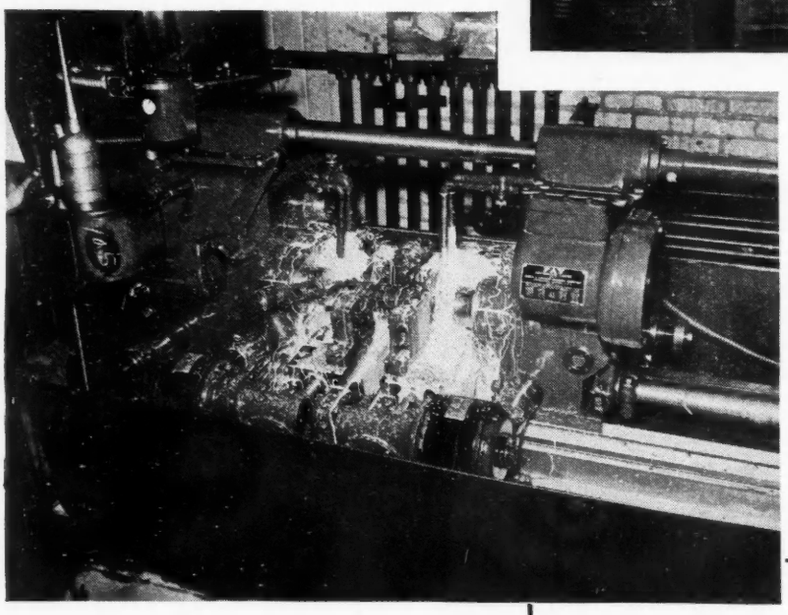
gears. These gears have 18 teeth, 0.8998 C.P., 1 in. face, and are cut with a 13½ degree spiral angle. A 5 x 5 in. ground hob is used, running at 80 r.p.m., with feed of 0.325 in. Cutting time is 20 minutes, with four gears per arbor load. It takes one minute to change the arbor load.

A battery of eight Lees-Bradner automatic multiple-station gear hobbers has been installed for the production of the large timing gears. All gear blanks, even the small differential side gears, are drop-forged, turning operations being performed on the conventional LeBlond and Fay automatics and other lathes. Wherever internal grinding operations are required, the gears are routed to the internal grinding department in the general machine shops, after heat treatment.

Although an independent unit in its own right, the heat treating department may be considered in our discussion of the gear plant, since most of the work is performed for this department. Heat treating facilities have grown amazingly since the first A-C heat treating unit was erected, and in a way this growth

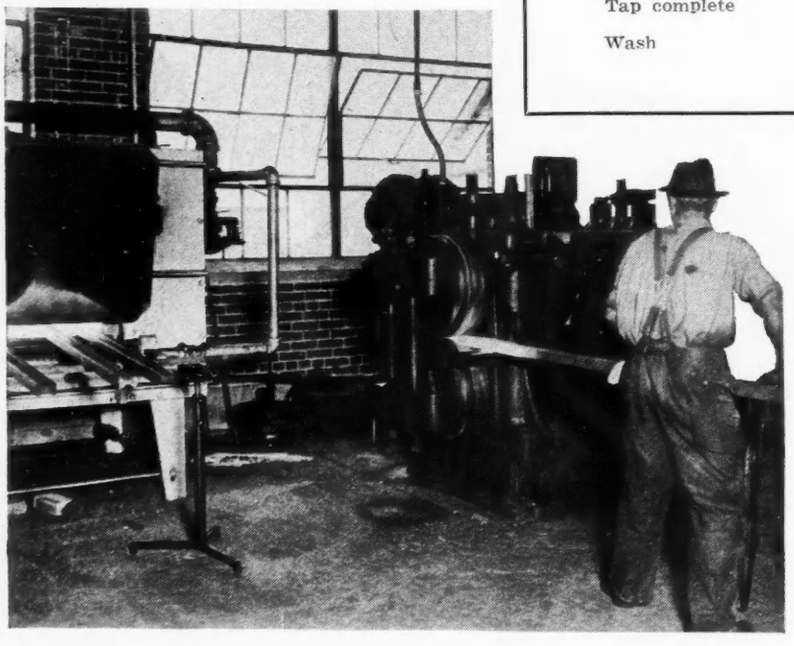


Bullard-Dunn de-scaling machine is important part of equipment in heat treat department as every gear is chemically cleaned after heat treatment. Note star-shaped frame overhead that carries racked gears from tank to tank in an automatic cycle.



(Above) J & L Fay automatic lathe is part of battery used for turning and centering operations in gear department.

(Below) Massive Williams & White rolling machine, rolling plow beams at Lacrosse works.



Factory Routing Clutch Housing Model W Tractor

OPERATION	EQUIPMENT
Mill ends and bottom face	Newton rotary milling machine
Mill sides—5.347 in. wide	Special Kearney & Trecker milling machine
Bore and ream complete	Defiance 3-way boring machine
Drill complete	Ingersoll Power Pack drilling machine
Tap complete	Greenlee 3-way tapping machine
Wash	Blakeslee washing machine

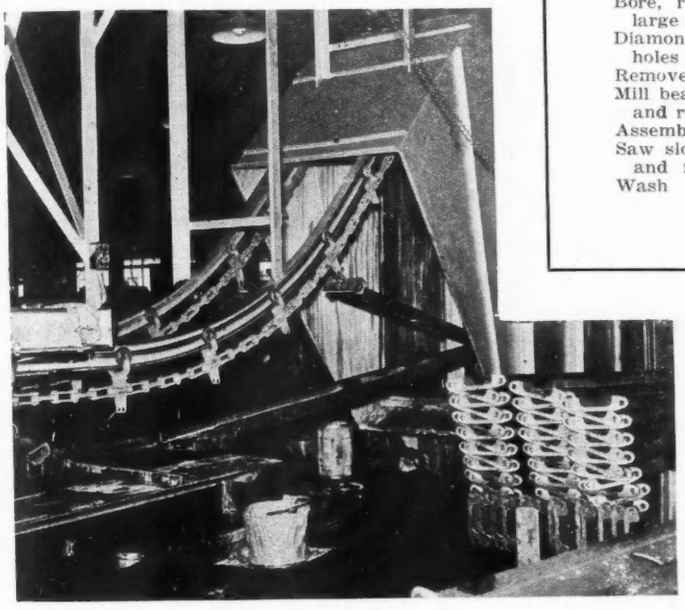
has paralleled the modern developments in metallurgy. For instance, the original unit was a small structure containing a number of oil-fired carburizing furnaces and oil-fired hardening furnaces. Later, when it was necessary to double capacity, they added a new unit containing electric-heated equipment made by Hevi-Duty. More recently, a third unit was added. This consists of a battery of Surface Combustion Corp. propane-fired heat treating furnaces and a battery of Mahr. Mfg. Co., propane-fired rotary hardening furnaces, all operated from a centralized propane distribution system.

In the new department for carburizing tractor transmission gears there are two continuous Eutectrol (Surface Combustion Corp.) gas-type carburizing furnaces using propane as the heating medium. When carburizing to an average total depth of 0.055 in. case, each furnace has a net capacity of 460 lb. per hour or approximately 11,000 pounds per 24 hours.

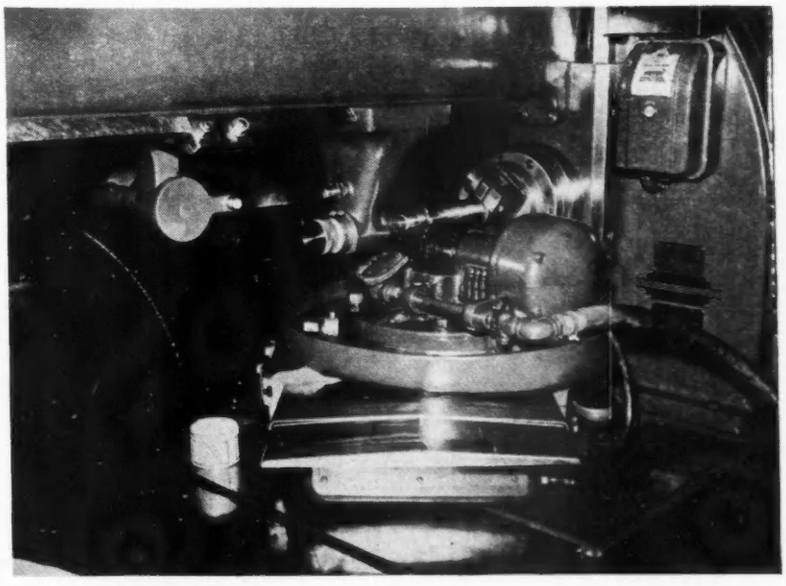
The Eutectrol process of gas carburizing consists essentially of passing the work to be carburized progressively through a muffle while exposed to the action of a properly prepared carburizing gas. At Allis-Chalmers the carburizing gas is prepared from propane which is processed in a special preparation unit known as a "char gas" unit. The processed gas is in turn mixed with raw propane gas in definite proportions and the mixture introduced into the muffle.

Factory Routing Connecting Rod Model W Engine

OPERATION	EQUIPMENT
Drill and ream pin end	Natco Driller—3-station fixture
Mill locating pad on cap and rod, mill slot and face for bolt on pin end	Sundstrand Rigidmil
Mill joint faces on cap and rod	No. 3 Sundstrand milling machine
Mill faces for bolt head—large end	No. 2 Producto hand milling machine
Drill, chamfer and ream bolt holes, cap and rod	Natco multiple spindle driller
Spotface cap and countersink bolt holes in rod and wrist pin hole	No. 2 Allen single spindle drill press
Drill and tap pinch bolt	Natco two-spindle drill and tap machine
Grind burrs on cap and rod	Bench
Assemble cap, shims, bolts, and nuts to rod	Bench
Straighten	Bench
Bore, ream, face and chamfer large end	Natco multiple spindle machine
Diamond bore crank and pin holes	Ex-Cell-O two-spindle machine
Remove cap	Bench
Mill bearing lock groove in cap and rod	No. 1—U. S. Hand milling machine
Assemble cap to rod	Bench
Saw slot through wrist pin end and file burrs	Bench
Wash	Blakeslee washing machine

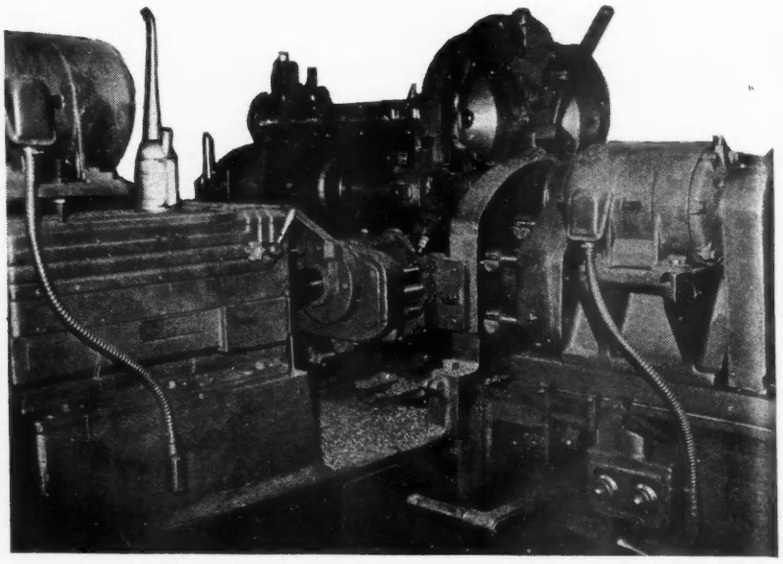


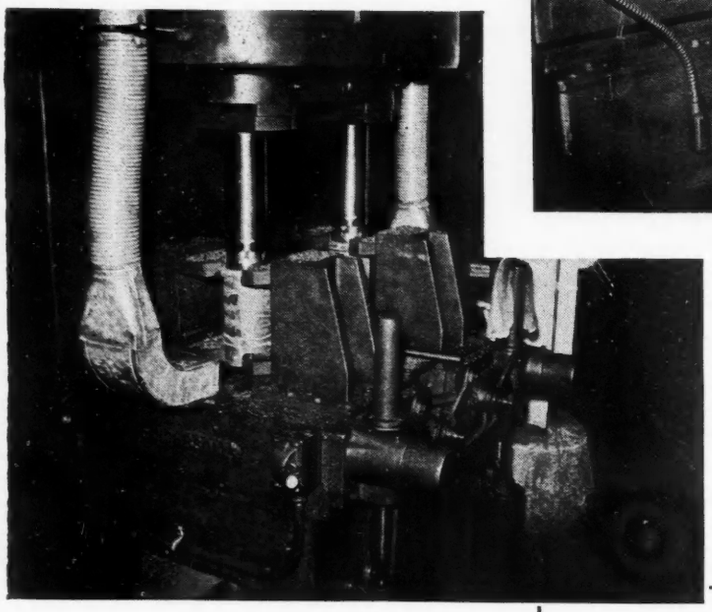
Machined tractor side rails go through this Mahon washing machine for chemical cleaning before paint.



Cutting taper spline on transmission pinion—one of the new Barber-Colman Model T, taper spline hobbing machines.

After the gears have been carburized, they pass to a battery of two (2) propane-fired rotary hardening furnaces made by the Mahr Manufacturing Company. Firing by means of one vertical burner into a conical duct in the hearth insures uniform heating throughout the entire furnace, especially at the door where work is charged and discharged. The rotary hardening furnaces are based on novel engineering designs developed by Allis-Chalmers. Depending upon the steel specification and duty, gears are quenched either in oil or water with either single or double quenching cycle. The hardening treatment is followed by a draw in two (2) Propane-fired draw furnaces made by Lindberg Engineering Co.





(Above) Unique multiple head Simplex Stokerunit combination milling and drilling machine for machining "B" tractor torque tube. Milling stations in background. Foreground shows one of the Ex-Cell-O precision drilling units for the drilling operations.

(Left) Ingersoll two-spindle boring machine is first operation — rough bore—on Model "W" cylinder liners.

Factory Routing Cylinder Liner Model W Engine

OPERATION	EQUIPMENT
Rough bore—(2 per setting)	Ingersoll 2-spindle machine
Rough turn and face	Porter-Cable Carbo Lathe
Semi-finish bore—(2 per setting)	Ingersoll 2-spindle machine
Finish bore (1 per setting)	Neff-Kohl and Bissel single spindle machine
Finish turn face and groove	Porter-Cable Carbo lathe
Water test (2 per setting)	Allis-Chalmers high pressure test fixture
Hone bore	No. 15 Moline honing machine
Wash	Washing machine Blakeslee

Current acquisition connoting modernity is the huge automatic Bullard-Dunn process equipment used for de-scaling parts after heat treatment. It takes the place of sandblasting heat treated tractor parts, including transmission gears, reduces sandblast cost and achieves better results by complete removal of all scale, even from recesses and places difficult to reach by sandblasting. Furthermore, the work after cleaning is left with a tin film which materially increases its shelf life by preventing early corrosion. The tin plate may be removed in the degrease tank, where the work suspends from the anode bus bar, if removal is desired.

Sequence of operations in this process are as follows:

1. Alkali degrease
2. Cold water rinse
3. Bullard-Dunn acid descale
4. Cold water rinse
5. Hot water rinse

Acid and the hot water rinse tanks are lead lined. The alkali and acid tank are provided with a 2000 ampere, 6-volt generator for supplying current. The alkali tank uses a commercial metal cleaning compound with the work as the anode. In the acid tank the work is cathode, the anodes being ferro-silicon, with the exception of one or more tin anodes which supply tin to the solution for plating out upon the work.

The installation uses a No. 9 Bullard station type conveyor with six stations, the sixth station being used to load and unload work on the hanger arms. The machine has a 51-in. lift and is capable of carrying 1500 lb. per arm.

After the work has been heated in the hardening furnace to a temperature dependent upon the chemistry of the material, mass, and physical characteristics desired, the trays are pulled by hand onto a discharge table. From this table, the work is picked up by means of a hoist and carried to the quench tanks. Trays are returned to the charge end by the means of a roller conveyor.

Quenched work from discharge platform of the quench tanks is loaded on trays at the charge end of the draw furnace. The loaded trays are pushed through the draw furnace, heated to a temperature dependent upon physical characteristics desired.

The draw furnace is of "convection" type, heating being accomplished chiefly by convection brought about by circulation of the hot products of combustion. The source of heat is a single air heater located on top of the furnace, hot products of combustion being distributed beneath the work by suitable ductwork and control dampers.

At the discharge table, forgings are placed in skids, and trays are sent to the charge end of the furnace by means of a roller conveyor. Trays used in the draw furnace were made by Allis-Chalmers of a special analysis cast iron. The cycle by which 1275 lbs. of material is hardened and drawn per hour is completed with a Brinell hardness inspection performed with a power-operated, direct-reading Brinell machine.

Finally, there is a sound-proofed enclosed room which serves as the gear laboratory, equipped with Illinois gear checking master equipment of various kinds. Here are checked not only the production gears but all experimental work as well as hobs and shaper tools used in production.

Plant 1

This is the original tractor plant, a four-story building now devoted to the production of tractor parts, accessories for all divisions of the tractor unit, and all engines for the large tractors built at West Allis and elsewhere. Engine activity includes the building of A-C oil engines which are essentially interchangeable with the gasoline engines.

Big engines both for West Allis and Springfield are assembled on the first floor on a special assembly line for each type. Here will be found a new assembly line on a Matthews table-height roller gravity conveyor for the Model E and K engines. This floor also contains the test stands and dynamometer blocks for full schedule testing of all large gasoline and oil-burning engines.

The second floor, east half, site of the original tractor department, is concerned with general machining operations for special gearing, various odd parts, and power-take-off units on special orders. The west half is devoted to the machining of heavy parts such as cases of all kinds for the big units. The third floor has been cleared of all manufacturing operations to make way for a modern service stores department carrying parts for current as well as non-current machines.

The fourth floor has machine shop lines for minor engine details for the large engines, including parts such as—connecting rods, cylinder liners, brackets, etc. On this floor, to, is the precision department with equipment for inspecting the DECO fuel pumps and injectors; and the assembly of the unique fuel oil filters that guard the performance of all A-C fuel pumps.

Before leaving Plant 1 it is important to note that the modernization program left its imprint even on the machine shop lines for the older lines of big engines. A cursory trip

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around the manufacturing floors will reveal many new machines of the latest type and, surprisingly for the volume of production, many of these are of the flexible unit-type design such as may be found in an automobile plant.

Foundry

West Allis boasts two foundry plants—Plant 1 with a capacity of 90 tons per hour of various cast iron compositions; Plant 2 with a capacity of 50 tons per hour. These plants produce all of the castings used in the tractor division.

Plant 1, the larger of the two, supplies all of the large castings such as cases and cylinder blocks, while Plant 2 is devoted almost exclusively to the production of the great variety of small parts. Both plants are modernized in every detail, utilizing power-driven pouring lines, core blowers, semi-automatic molding machines, covered ladles for iron and laboratory control of the system sands and core sands.

Prize exhibit in Plant 2 is a self-contained molding department styled by the Jeffrey Mfg. Co. for producing various small castings. It comprises two merry-go-round power driven conveyors, each one looping around a battery of Osborn semi-automatic molding machines. Overhead, each of the molding machines is served by a sand-handling unit. Pouring ladles are transported on an overhead monorail with operators pouring the molds while standing on a movable platform with a safety trip at its terminal.

At the other end of each of the two molding lines is the shake-out station from which the parts are dumped onto a power-driven plate conveyor transporting the castings and dumping them into tote boxes.

Another bright spot in Plant 2 is the group of two merry-go-round Matthews power-driven molding conveyors for larger castings handled here. Interesting feature of these lines is the fact that the two sides of each line run parallel and very close together in the interest of space economy, terminating in wide loops at each end.

In the No. 1 foundry, there is a new self contained Beardsley and Piper sandslinger unit with two heads, one for molding the cope, the other for the drag. At the far end is a heavy jolt self contained unit styled by the Chain Belt Co., and used for heavier castings for the larger tractors. In addition, there are three automotive type sandslingers and another self contained sandslinger unit which have been used for tractor castings for several years.

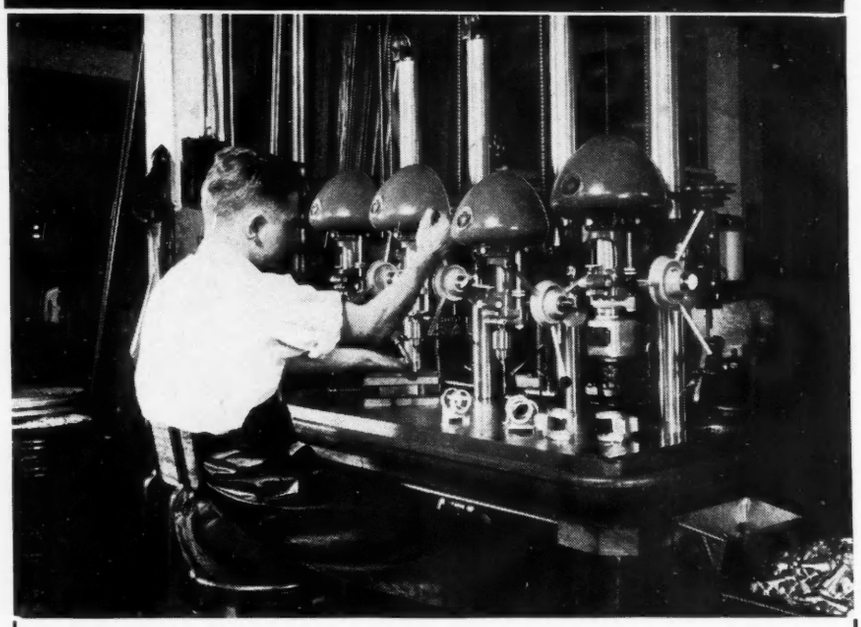
Both foundries have several new continuous core ovens with temperature and air flow control, and also continuous ovens for drying dipped cores. All raw materials are checked by the laboratory for quality and a careful control is insisted on in all operating conditions.

Special Details

The foregoing is intended to give a rather generalized picture of the over-all operations when taken together with the comprehensive pictorial section. However, there is a wealth of detail in the various operations and machines in the new program. To provide some appreciation of these, we give in this final section a brief but comprehensive summary of the high-spots of the production of a number of important parts of the engine and chassis.

As mentioned earlier, all A-C engines use replaceable cylinder liners to facilitate engine maintenance by the user. To this end the liners for a given engine are made absolutely

HOW INDUSTRY SAVES BY USING LIGHT POWER TOOLS



LOW first cost, economical operation and low maintenance cost are some of the reasons for the rapid adoption of light power tools by industry.

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interchangeable which means that all vital dimensions are held right on the "nose." There are four separate liner machining lines to take care of the entire range of current engines. The routing for the "WC" liner is typical of all but represents the very latest equipment and tooling for high production.

The "WC" crankshaft line also is entirely new. It comprises a battery of the latest type of LeBlond lathes and uses Landis grinders exclusively for all grinding operations. One of the unique machines in this department is the six-head Aveymatic sensitive drilling machine which takes all crankshaft oil holes in one setting. This tightly knit department is served by an overhead rail with hooks for transporting the heavy crankshaft carrier fixtures.

Cylinder blocks and heads for the "WC" engine begin their routing simultaneously on the same machine —the Niles rotary miller. The drum type fixture of this machine takes heads and blocks in alternate positions so as to produce balanced sets for each engine. As heads and blocks leave this station they divide and move down separate but parallel machine lines, noted on the routings.

Greenlee machines are used exclusively for the drilling, tapping, and boring operations on the cylinder block, as indicated on the routing. As a matter of interest we give below the sequence of operations the second operation Greenlee, a three-way horizontal and vertical drilling machine with two-position fixture and hydraulic feed. Its function in sequence is as follows:

Position "A"

L.H. Head (Valve Side)	Vertical Head (Bottom)
6—5/16 in. drill for ⅜ in.-16 Tap	2—Combination drill and ream 0.562 locator holes
1—11/32 in. drill	2—7/32 in. drill (Bearing locks)
1—Drill for 0.750 ream	15—¼ in. drill for 5/16 in.-18 tap
	7—7/16 in. drill to cam bearing

Position "B"

Vertical Head (Bottom)	R.H. Head (Manfold Side)
1—¼ in. drill for 5/16 in.-18 tap	1—3/16 in. drill
8—Drill for 0.7505 ream (valve)	1—Combination re-drill for ⅞ in.-18 tap, drill 7/16 in. and spotface 1-5/16 in.
6—17/32 in. drill for ⅝ in.-11 tap	

Natco drilling machines are found on many machine lines such as the cylinder head, connecting rod, and others to be noted later. Third operation machine on the head is a two-way horizontal multiple spindle drilling machine composed of two Natco C8H hydraulic units complete with cluster boxes.

Mounted on the center pedestal is a three deck fixture arranged with the lower deck having a two-position sliding fixture. Entire holding unit is arranged to hold one cylinder head in each deck.

Operations

R.H. Head—*First Deck—Bottom of Part*

Position No. 1—Drill 14 holes. Core drill 8 valve ports and spot drill 8 valve guide holes.

Position No. 2—Drill 21 holes and ream 2 holes.

Second Deck—Opposite Manifold Side

Drill 1 hole

Third Deck

Idle

L.H. Head—*First Deck—Top of Part*

Position No. 1—Drill 7 holes

Position No. 2—Ream 2 holes

Second Deck—Manifold Side

Drill 6 holes

Third Deck—Spark Plug Side

Comb. drill and counterbore 4 spark plug holes

One operator maintains a produc-

Eliminates

STICKING · BINDING · FRICTION

● Functioning consistently under all possible conditions . . . balanced to control the circulation of water regardless of pump pressures . . . Dole double port poppet type thermostats offer this additional important advantage:

Due to a unique universal motion joint for connecting the thermostatic element *they cannot stick, bind or cause friction.* Write for complete engineering data and performance records under varying road, load and weather conditions.

FOR UNIFORM PERFORMANCE USE DOLE PRODUCTS

Dole Thermostatic Bi-Metal is known through the industry for accuracy and *reliability.* Dole Draft Deflectors are approved accessories for many cars. Dole Fittings, listed by Underwriters' Laboratories—Re-examination Service, range from compression couplings for all tubing connections to a complete assortment of hose line parts for hot water heaters.

DOLE

Thermostats

THE DOLE VALVE COMPANY • 1901-1941 Carroll Ave., Chicago, Ill.

Detroit Office: 2-137 General Motors Building

tion of approximately 14 parts per hour.

As an example of the advanced mechanization at every turn, we may note the operation of the Natco machine installed for the machining of special power-take-off housings. This is a two-way hydraulic machine built of one vertical Holesteel and one horizontal Holeunit. Mounted on the steel base is a 44-inch diameter five position hand indexed rotating table with a single holding unit arranged to hold two housings, each in a different location.

Operations

Position No. 1—Remove one part, relocate other part, and load one new part

Position No. 2—*Vertical Head*
Location A — Rough face large diameter

Location B—Drill 1 hole ½ depth
Position No. 2—*Horizontal Head*
Location A—Drill 5 holes
Comb. drill and ream 1 hole
Location B—Drill 1 hole
Position No. 3—*Vertical Head*
Location A—Comb. rough bore and finish face 3 diameters. Also finish face large diameter. Drill 1 hole through 2 walls.

Location B—Comb. drill 1 hole, ream to depth and rough counterbore 1 diameter.

Position No. 4—*Vertical Head*
Location A—Comb. semi-finish 3 diameters. Semi-finish ream 1 hole through 2 walls.

Location B—Drill 3 holes. Comb. semi-finish 2 diameters and face end.

Position No. 5—*Vertical Head*
Location A—Comb. finish 3 diameters

Finish ream 1 hole through 2 walls

Location B—Finish ream 2 diameters

One operator maintains a production of approximately 12 parts per hour.

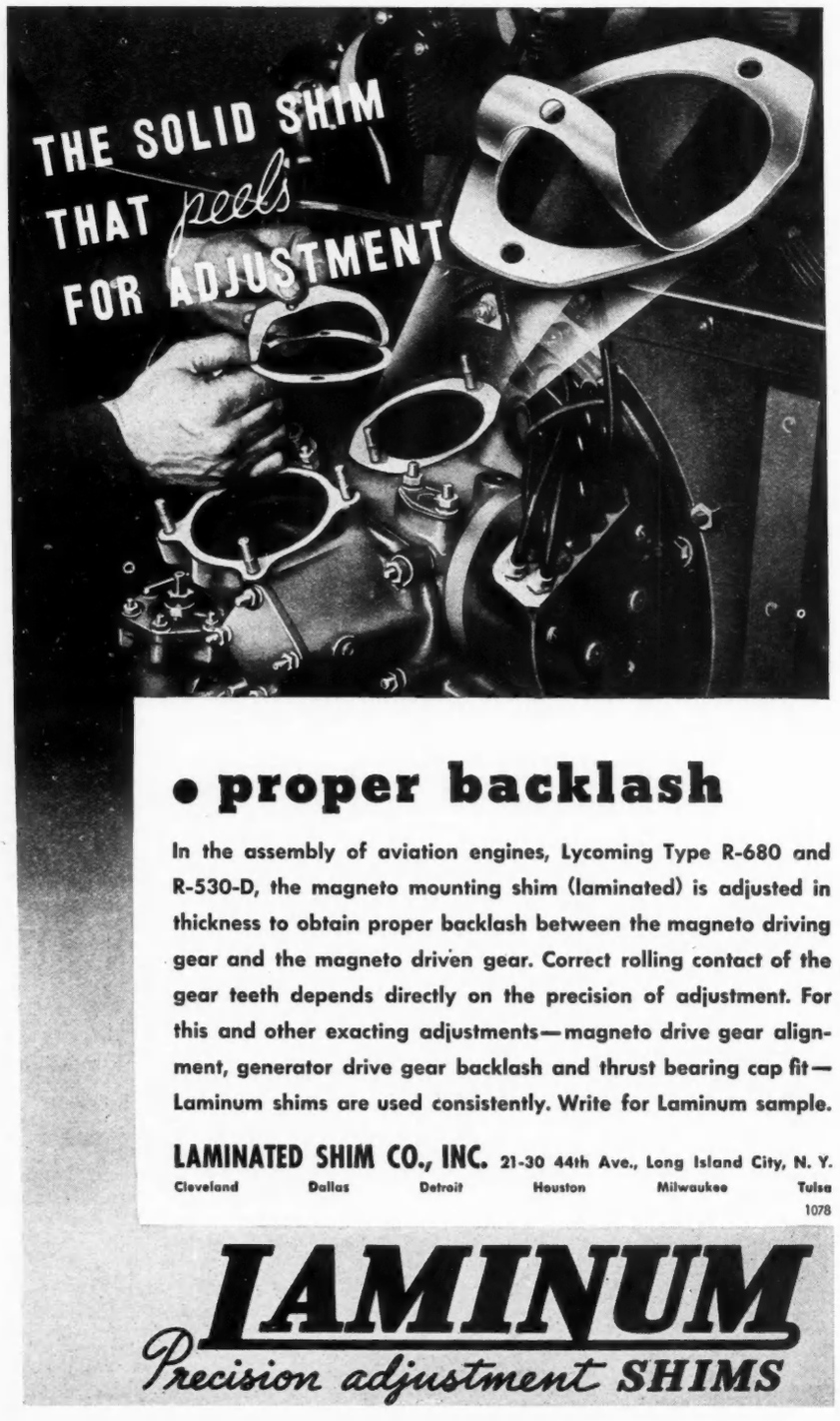
Two unusual pieces of multiple head equipment were supplied for the new "B" tractor line by the Stokerunit Corporation, Milwaukee, Wis. The first of these is a four-station milling and drilling machine for the first operation on the torque tube. It is of interest to note that the drilling heads are the well known Ex-Cell-O precision units.

The first position of the fixture is the loading station, work being held in place by pivoted clamps which hold it firmly against locating blocks. The fixture is then indexed through 90 deg. In this position both ends of the work are milled. The 15 in. face milling cutter on one end and the 12 in. face mill on the other end are carried on unit milling heads with independent motor drives. The unit milling heads are mounted on bases which have automatic hydraulic feeding cycles.

Next position of the fixture allows ends and side of the torque tube to be drilled and bored. Three Ex-Cell-O hydraulic ram type drilling units are used to drill the four holes in the small end, and the seven holes in the side of the torque tube. The operations on the large end of the tube are made with a six-spindle combination drilling, boring and spot facing head mounted on a base which has an automatic hydraulic cycle.

Entire cycle of this machine is controlled from a conveniently located push button panel. Electrical interlocks have been inserted into the circuits so that no operations may be started until the fixture is properly indexed and clamped.

Another of the special Stokerunit machines was built for completely drilling, milling and reaming the "B" tractor front axle. The steel forging is placed upon locating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THAT peels
FOR ADJUSTMENT
• proper backlash
In the assembly of aviation engines, Lycoming Type R-680 and R-530-D, the magneto mounting shim (laminated) is adjusted in thickness to obtain proper backlash between the magneto driving gear and the magneto driven gear. Correct rolling contact of the gear teeth depends directly on the precision of adjustment. For this and other exacting adjustments—magneto drive gear alignment, generator drive gear backlash and thrust bearing cap fit—Laminum shims are used consistently. Write for Laminum sample.
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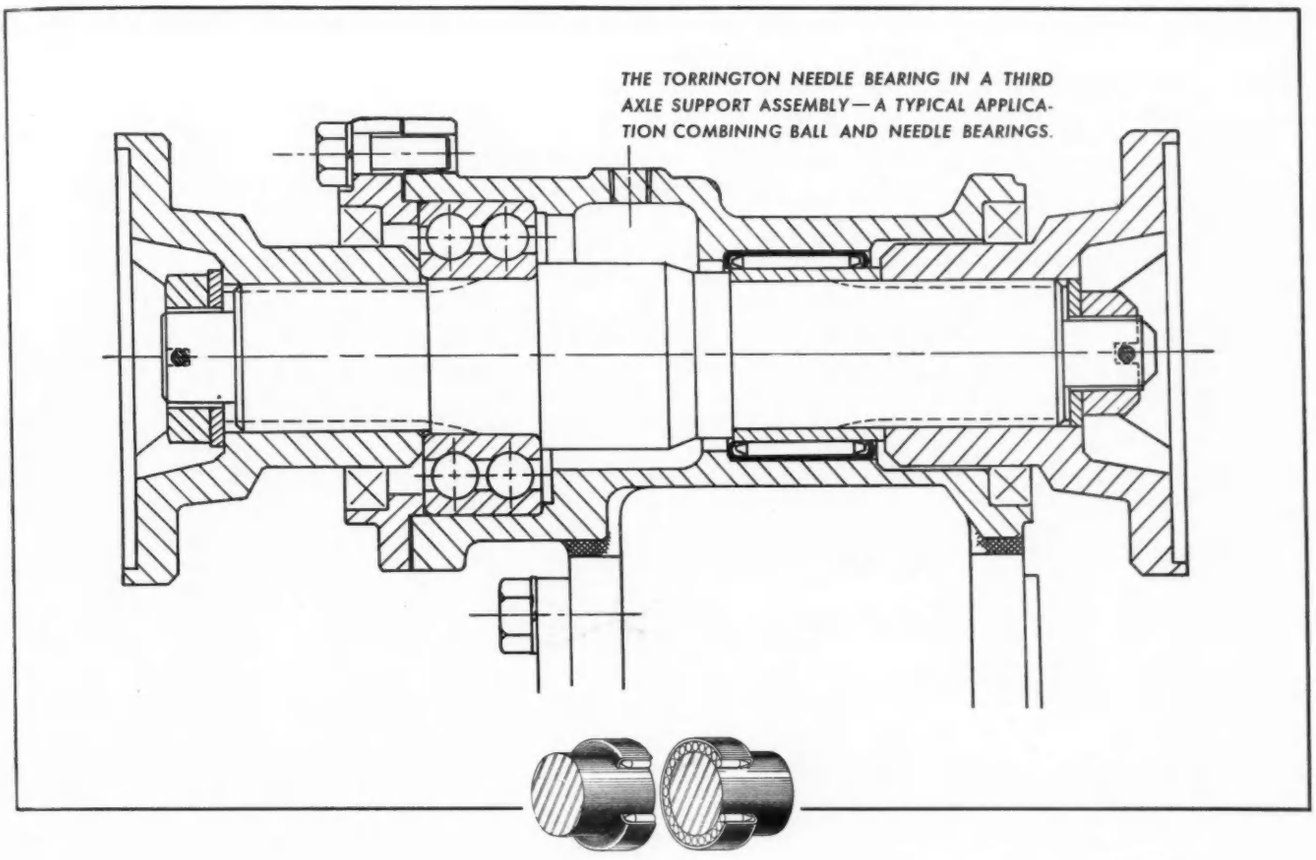
TORRINGTON NEEDLE BEARING

DESIGN AND SERVICE FEATURES



THE TORRINGTON NEEDLE BEARING IN A THIRD AXLE SUPPORT ASSEMBLY—A TYPICAL APPLICATION COMBINING BALL AND NEEDLE BEARINGS.

BEARING CONSTRUCTION ASSURES AMPLE LUBRICATION

Lowers Maintenance, Increases Life

THE CONSTRUCTION of the new Torrington Needle Bearing assures ample, constant lubrication, contributing materially to the life of the bearing and reducing the need for service attention. The hardened retaining shell which holds the needles in a single compact unit serves also as a reservoir for a large quantity of oil or grease, keeping the shaft, which serves as the inner race, constantly floating on a lubricating film. This is particularly important in heavy-duty applications like the support assembly for the third axle, shown in the illustration—an interesting example of the combination of ball and needle bearings in a single mechanism.

High radial load capacity, obtained by the bearing's many linear inches of contact, enables the bearing to withstand severe loads in either rotating or oscillating applications.

Low Unit Cost

The Needle Bearing is low in unit cost, and its use permits marked economies in housing design and in installation expense, making it possible to obtain full anti-friction construction at a cost comparable to that of simple bushings. It is readily pressed into place, and requires only the simplest type of housing structure.

The Torrington Engineering Department will cooperate in the laying out of bearing applications utilizing the advantages of this unusual bearing in your products. Further information is given in the Torrington Needle Bearing Catalog, available on request. Write for Catalog No. 7. Specifications on Torrington Ball Bearings may be obtained by requesting Catalog No. 401.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.
Makers of Ball and Needle Bearings
Branch Offices in all Principal Cities

TORRINGTON
NEEDLE BEARING

blocks and retained by a self-centralizing clamp. Heavy strap clamps hold the axle in hardened rest blocks. The first operation on the axle is the straddle-milling of the ends with two sets of 8 in. diameter straddle mills. These mills are carried on unit milling heads driven by independent motors and are mounted on bases which have automatic hydraulic cycles.

When the milling heads recede from the cut, the table on which they are mounted stops against a positive stop. With heads in this position, the drill bushing for the king-pin hole is in line for the next operation—the drilling and reaming of the 1⅜ in. dia. holes with Ex-Cell-O ram type drilling heads. During the time that these holes are being drilled, a vertical drill head is started and the 29/32 in. hole for the swivel bolt is drilled through the axle. After reaming the 1⅜ in. dia. hole, the operator starts two drill heads which are mounted inside the center section of the machine and drills two 5/16 in. dia. oil fitting holes into the ends of the axle for the final operation.

Among the many distinctive features to be found in the plant is a small department for welding the gas tanks. The tanks for the small A-C machines are rectangular in shape and made up of two light stampings joined by the oxy-acetylene torch. The fixture used for this purpose is most ingenious. It consists of a small frame fitted with a rotatable head for holding the work, at one end, and a tractor seat for the operator, at the other end. The rotating head is turned slowly at welding torch speed by means of a motor driven speed reducer geared to the fixture.

Impact Test Used in Development of Steels

AMERICAN engineers in the past have not paid very much attention to the impact test, but from a recent symposium on the subject before the A.S.T.M. it appears that their attitude toward the test is changing. The impact test shows the amount of work a specimen will absorb before final failure, and, therefore, is applicable particularly to parts subjected to variable repetitive stress in service. G. C. Riegel and F. F. Vaughn of the Caterpillar Tractor Co. reported that their company, by developing steels of progressively higher impact strength, had been able to reduce the failures of gears, track shoes, and other parts without changing the shapes of the parts and without appreciable change in the ultimate strength, hardness, and ductility of the material. They use the impact test not only as a measure of the resistance of the metal to sudden blows, but also to determine the likelihood of brittle failure under normal static loading at points of stress concentration. D. J. McAdam, Jr., and R. W. Cline asserted that notch impact testing is primarily a method of testing for potential brittleness in a material under all types of service, rather than a method of testing for resistance to the effect of sudden blows, the notch acting to intensify any tendency toward brittleness which may be present, in the same way as would a lowering of the temperature or, to a lesser degree, an increase in the velocity of the blow.

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A. S. Kirkeby, *Managing Director*

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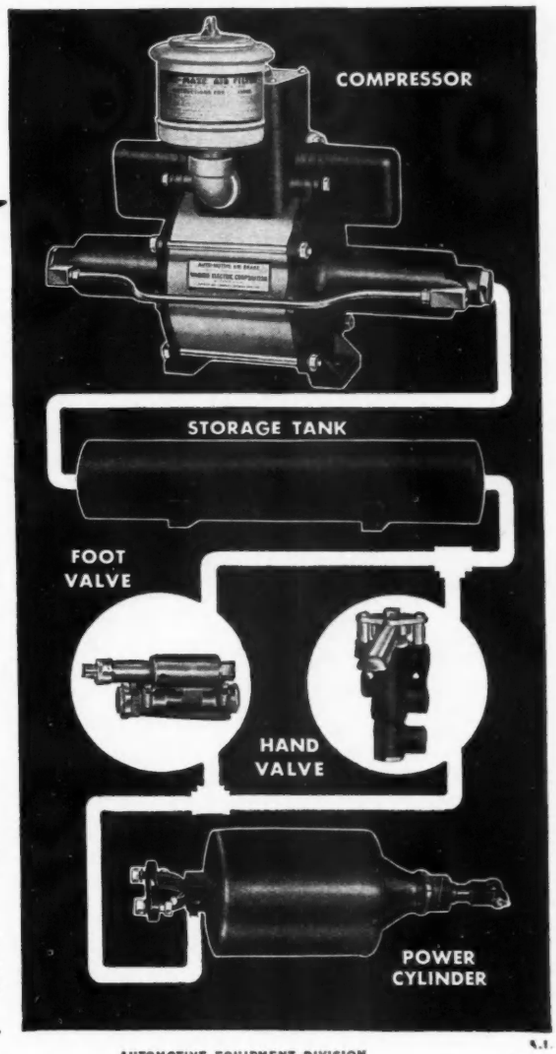
It will pay you Truck, Tractor, Trailer and Bus Dealers and Manufacturers to investigate the many advantages of Auto-Motive-Air. The coupon will bring complete information.



WHAT A FEW OF THE THOUSANDS OF SATISFIED USERS SAY—

"Our run of 285 miles between Eureka and San Francisco, over the Redwood Highway, is an especially severe test on brakes because of the great number of curves and grades. We have used Auto-Motive-Air for nearly three years, during which time our equipment has traveled 600,000 miles. At no time were we held up or delayed because of trouble with Auto-Motive-Air. Our drivers have complete confidence in their ability to stop quickly under any condition, and this has resulted in decreased running time and a saving in tires, brake lining and general service." (Eureka, Calif.)

"Our trucks maintain a daily schedule of 400 miles with ten-ton pay loads, and units on which Auto-Motive-Air has been installed, perform in such a satisfied manner as to convince the writer that they are a real investment for any truck operator." (Missoula, Montana.)

"Allow us to express our appreciation for the wonderful service we have obtained in the past 5 years from the use of Wagner Auto-Motive-Air. We know there is none better." (Laramie, Wyoming.)

"We first installed Auto-Motive-Air on a 1933 Chevrolet truck and Springfield trailer. Now each additional unit purchased must be equipped with Auto-Motive-Air. It has played a major part in our safety campaign, and in the past five years we have had only one minor accident." (Dallas, Texas.)

"In 1934 I purchased a twenty-two-foot semi-trailer stock truck and had it equipped with Auto-Motive-Air. Since then I have had four Chevrolet trucks, and have used the same compressor. I have never relined any brakes, and I feel that it has more than paid for itself in brake linings alone." (Lindsborg, Kansas.)

"Our two units, which we have equipped with Auto-Motive-Air in May, have to date run better than 60,000 miles with absolutely no trouble as far as brake equipment is concerned, and has solved our brake problems. All our new equipment in the future will have Auto-Motive-Air." (Chester, Pa.)

"We are so well pleased with Auto-Motive-Air installed on our truck that we feel we should write you expressing our satisfaction. This truck was seldom used because it never had brakes, but since installing Auto-Motive-Air we use it constantly with no brake trouble." (Buffalo, N. Y.)

"Just a word to congratulate you on the wonderful product you have in Auto-Motive-Air. It is five years since we made our first installation. Now our entire fleet is equipped with Auto-Motive-Air. We cannot recommend them too highly to those who want positive brake action at all times." (Austin, Texas.)

"We have had Auto-Motive-Air installed on our S A Autocar, and I am glad to state that this equipment has been most satisfactory. This truck has run 60,000 miles in the past three years, and in that time the brakes have only been relined once, but there has been no service on Auto-Motive-Air. We will not hesitate to install Auto-Motive-Air on any future trucks we buy." (Philadelphia, Pa.)

(Originals of these letters and many more just as enthusiastic are in our files, and names can be had upon request.)

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LETTERS

(Continued from page 278)

immense amount of work on the metal in reducing the cast steel ingot to the bar or billet. The twisting and turning of the metal through the many passes draws out the original cast grains into long thin fibers, similar to the twisted strands in a steel cable. The upend forging process bends those fibers over upon themselves, producing an interlocked fiber structure that cannot be duplicated by any other manufacturing process for making gear blanks.

A comparison of the fiber structure between the centrifugal casting and the upend forging is interesting. One photograph shows the grain structure of the centrifugal casting along the rim of the blank, and when teeth are cut into the blank, the fiber structure will be cut so as to place the grains in the weakest position for resisting impact and shock. On the other hand, the fiber structure in the upend forging is such that a maximum of resistance to stresses is obtained.

Many actual tests show that proper control of flow fibers has been responsible for the complete elimination of breakage on such highly stressed parts as crankshafts, connecting rods and gears in any number of the varied lines of usage. These flow lines are fibers of strength, giving ductility and impact properties to the forging that provide permanence and security against failure.

It is common practice to furnish drop forgings to any specified grain size desired by the customer. A grain size within two numbers on the standard SAE chart of ratings from one to eight can be given the customer when specified. Ordinarily gears are specified with a grain size of six to eight, or one size finer than that termed "extremely fine" in this article.

Photographic illustrations of centrifugal casting sections tend to indicate that while the outer perimeter has been freed from blowholes and porous structure, this has been done at the expense of the center structure, which is much more porous than average casting structure. Contrast this with the dense and uniformly sound structure throughout the cross-section of the conventional die forging. Since all of the stresses are transmitted throughout the entire shafting and gear mechanism, it is not good design to attempt to strengthen the tooth section of the gear blanks at the expense of the center portion.

The photographs shown of cross-sections of gears accompanying the article would be sufficient for the forging buyer to reject an entire shipment, should this type of internal structure be found in a drop forging. While it is true that centrifugal casting process produces a sound and more dense outer structure than sand casting, nevertheless cavities and shrinks occur in the centers (as shown in the photographs) which lessen the strength of the part.

Fig. 4 in the article apparently shows two cluster gears which are cast end to end and then broken apart. The pipe extends entirely through one of these and into the other one, and if both of these parts are used they are certainly not uniform with each other. When one considers how quickly a forged part of this nature would be rejected by the inspector if it were made from a piped or seamy steel bar, one wonders how parts with a pipe extending the full length, as in this case, can be used.

It is also common knowledge that a uniformly dense forged structure will machine at faster speeds, promote longer tool life, and offer greater uniformity and less failures during the heat treating process than will the ordinary sand casting or the newly developed centrifugal casting with its less uniform structure.

When a drop forging is produced with a more uniform and more refined structure, it is easier to machine and a longer tool life may be expected. Contrast this with the open grained structure of the casting, with its average amount of voids, inclusions and blowholes.

This article does not say whether or not the parts are cast in permanent molds but some mention is made of sand cores, so in some cases at least part of the mold must be of sand; therefore, it seems questionable whether the weight of finished spun gears can be less than that of forged gears due to the accuracy of the processes.

Referring to Fig. 3, I am not familiar with the design of the Ford ring gear and whether it is regularly made with a large hub instead of the conventional design, which is actually a ring. The gear shown in the illustration has a thick web running to the center, and then a large hub with a shrink pipe extending almost through the hub. If the standard design of this gear is a ring, then certainly the weight has been greatly increased in order to make this part as a casting, and the remarks in the article about reducing the weight of raw materials that must be handled are not correct.

On the second page of the article it is again stated that the dimensions can be held much closer than in the case of forgings, leaving less excess metal to be machined off. It is very hard to see how casting processes could improve on the accuracy of a drop forging made in accordance with present standards.

It should be evident from the above that while all castings, and particularly the centrifugal castings, may have their merits for certain fields, they do not equal the die production forging in either grain flow, strength, machinability or economy.

RAYMOND M. SEABURY,
Secretary-Treasurer,
Drop Forging Assn.

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Physical soundness, correct hardness, size accuracy, and sphericity are guaranteed unconditionally in all Strom Balls.

Other types of balls—*stainless steel, monel, brass* and *bronze*—are also available in all standard sizes. Write for catalog and prices.

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Dollar Volume of New Car Financing Down 60%

Dollar volume of retail financing of new passenger automobiles showed a decrease of 60 per cent for the month of July as compared with July, 1937, and a decrease of about 64 per cent compared with July, 1936, according to preliminary estimates by the Department of Commerce. As compared with June, 1938, there was a decrease of about 9 per cent.

All percentages presented below are based on daily average figures with each business day of the week weighted according to the relative volume of business as determined by experience in the trade. Allowance has been made for the July 4 holiday. Comparison of July, 1938, with the same month of previous years and the percentage changes from June to July in past years are shown below.

Comparisons of July, 1938 with the same month of previous years

July, 138 was					
60.2	per cent	lower	than	July,	1937
63.9	"	"	"	"	1936
42.8	"	"	"	"	1935
38.0	"	"	"	"	1934
7.1	"	"	"	"	1933
67.7	"	higher	"	"	1932
29.4	"	lower	"	"	1931
42.7	"	"	"	"	1930
65.8	"	"	"	"	1929

June-July changes

Percentage change from June	
July, 1938	— 8.9
" 1937	—10.6
" 1936	— 8.4
" 1935	+ 3.3
" 1934	— 3.2
" 1933	+ 2.9
" 1932	—34.5
" 1931	— 4.5
" 1930	—20.9
" 1929	— 1.5

Canada's New Car July Sales Off 28% From July '37

Retail sales of new motor vehicles in Canada during the month of July, amounted to $9,215,074 compared with $12,992,722 in June and $12,810,854 in July, 1937. The decline from June was slightly less than seasonal.

July Overseas Tractor Shipments Dropped 22 Per Cent Below '37

Overseas consignments of tractors and parts during July, valued at $4,052,492, were 22 per cent below the corresponding figure for last year of $5,271,721, according to the Machinery Division, Department of Commerce. The division reported that smaller shipments were made in all export classes of wheel tractors, and all except two size categories of the tracklaying type. Wheel tractor foreign sales were down 14 per cent, $1,868,988 against $2,171,207, the reduction percentages being almost equally distributed over the three size classes, in which the shipments were as follows: 14 belt hp. and under, $78,474 against $88,751; 15-32 belt hp., $1,142,871 against $1,350,222; 33 and over belt hp., $647,643 against $732,234.

The tracklaying tractor sales were 38 per cent below a year ago, $1,426,103 against $2,285,464. Valued at $888,228, the exports of the fuel injection type were 42 per cent lower than in July, 1937, when they totaled $1,541,945, while a 28 per cent decline was recorded in the carburetor type, $537,875 compared with $743,519. As usual, practically all of the carburetor type shipments consisted of the smaller sizes (under 35 drawbar hp.), which were valued at $491,793 during the month. The fuel injection type sales were divided as follows: Under 35 drawbar hp., $198,584 compared with $71,445 a year ago; 35-59 drawbar hp., $289,059 compared with $987,716; 60 and over drawbar hp., $400,585 compared with $482,784.

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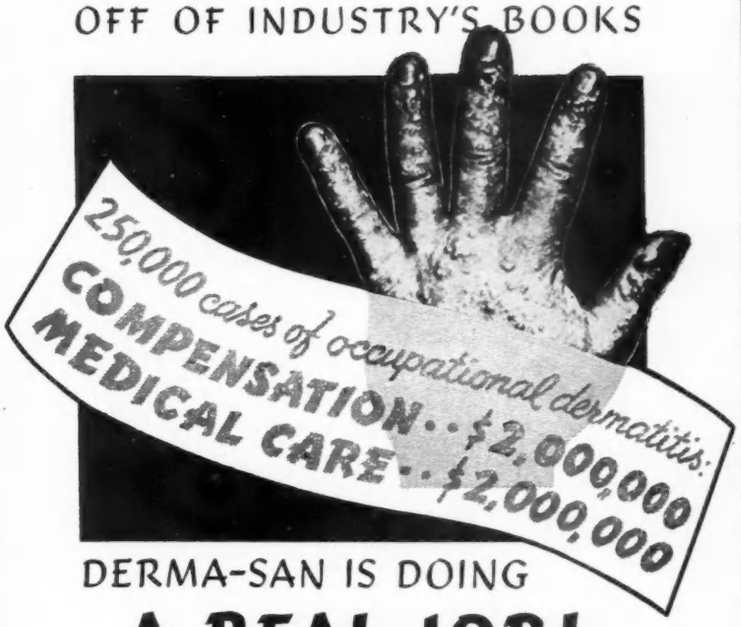

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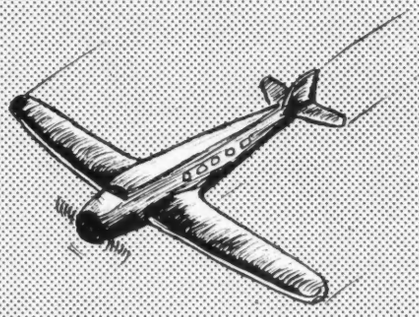
PLANE

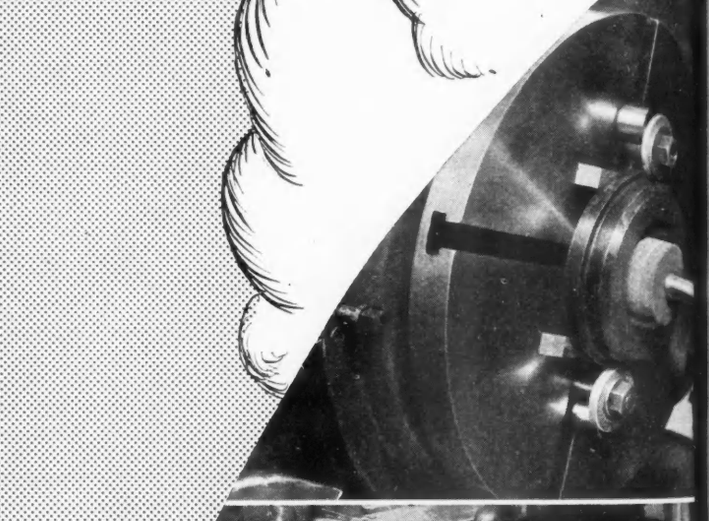


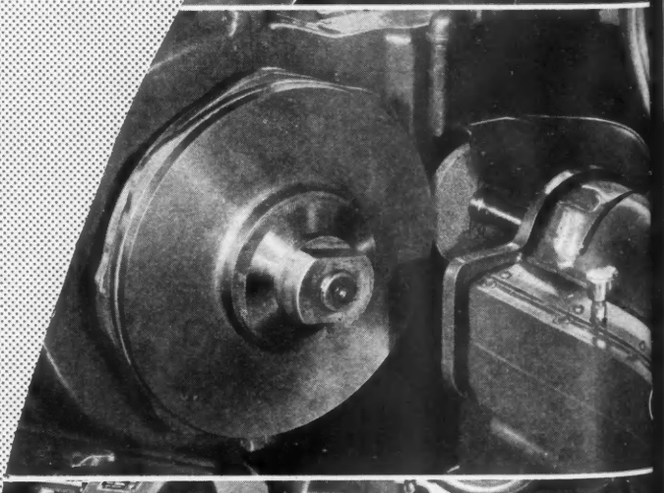
WE illustrate an even dozen plane facts on these two pages. Or expressing the thought in another way, we show you twelve different parts which are being ground on Landis equipment in some of the world's largest airplane plants.

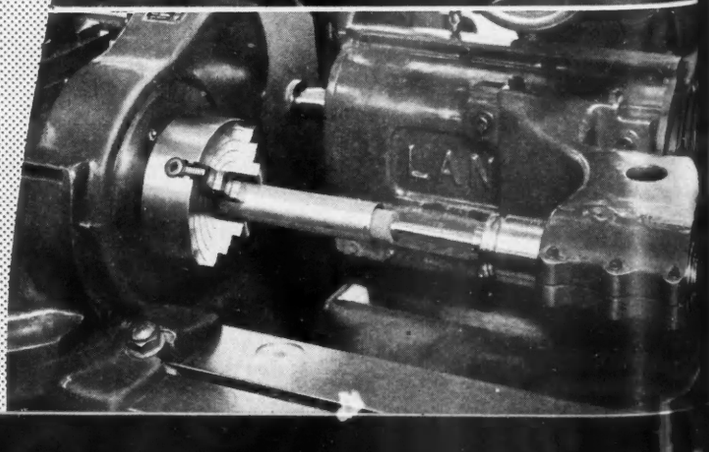
THESE ARE THE OPERATIONS WE SHOW

- **A** Internal grinding the bore of a piercing die on a Landis 14″ Type C Hydraulic Universal.
- **B** Relieving pistons on a Landis Hydraulic Piston Grinder.
- **C** Grinding the trunnions of an air screw shaft on a special Landis 14″ Type C Universal, raised to swing 38″.
- **D** Grinding aircraft cable eyes on a Landis 6″ Plain machine.
- **E** Grinding the pins of a double radial airplane engine shaft on a Landis 16″ Type D Hydraulic Crank Pin Grinder, raised to swing 20″.
- **F** Grinding a radial air cooled airplane cam on a Landis Type C Radial Cam Grinder. Angular cams are also handled using very similar equipment.
- **G** Grinding the taper end of a cam pinion shaft on a Landis 14″ Type C Hydraulic Universal.
- **H** Finish grinding the pin of an assembled crankshaft on a Landis 16″ Type D Hydraulic Crank Pin Grinder, raised to swing 25″.
- **J** Grinding the pin and the fit of an airplane crankshaft front end on a Landis 16″ Type D Hydraulic Crank Pin Grinder, raised to swing 25″.
- **K** Internal grinding an airplane landing gear part on a Landis 14″ Type C Hydraulic Universal.
- **L** Grinding the shoulder and flange of a radial airplane cylinder on a 14″ Type C Universal, raised to swing 20″.
- **M** Finish grinding the main bearings of an assembled radial airplane engine crankshaft on a Landis 14″ Type C Hydraulic Universal.

Nothing could recommend Landis equipment for the exacting requirements of airplane manufacture any more than the large number of world famous users. If you contemplate expanding your facilities or wish to improve both quantity and quality of output, come to Landis with your grinding problems. Or at least ask us for complete literature which tells in detail all of the interesting facts about the many modern Landis Grinders suitable for modern airplane manufacture. 272







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